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ABSTRACT

This compilation contains copies of the following library documents that presented recent cases for new space: (1) Excerpts from "Harnessing Technologies to Unleash Their Potential" and "Kelvin Smith Library. The Electronic Learning Environment--Transforming Access to Knowledge: A Program Statement" from Case Western University (Ohio); (2) "Future Growth of Collections: Publishing Trends and Electronic Information Storage" from the University of Florida; (3) "Factors to Consider in Evaluating Future Space and Storage Needs of the MU Libraries: A Library Patron's Perspective" and "Outline for Space Study for UM Library Directors and Presentation" from the University of Missouri, Columbia; (4) "The Future Ain't What It Used to Be--Information Management in the Nineties" from the University of Pennsylvania; (5) "Concept Document for an Addition to the Fondren Library" from Rice University (Texas); (6) "Library Addition Request: Summary of Building Program Planning Statement" from Southern Illinois University, Carbondale; and (7) "Libraries, Books, and Technology" from the University of Tennessee, Knoxville. The accompanying flyer addresses four common fallacies and presents strategies for the library of the future. (MES)

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SYSTEMS AND PROCEDURES EXCHANGE CENTER

# Kit 200

## 2001: A Space Reality
## Strategies for Obtaining Funding for New Library Space

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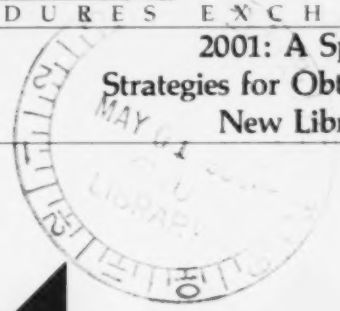

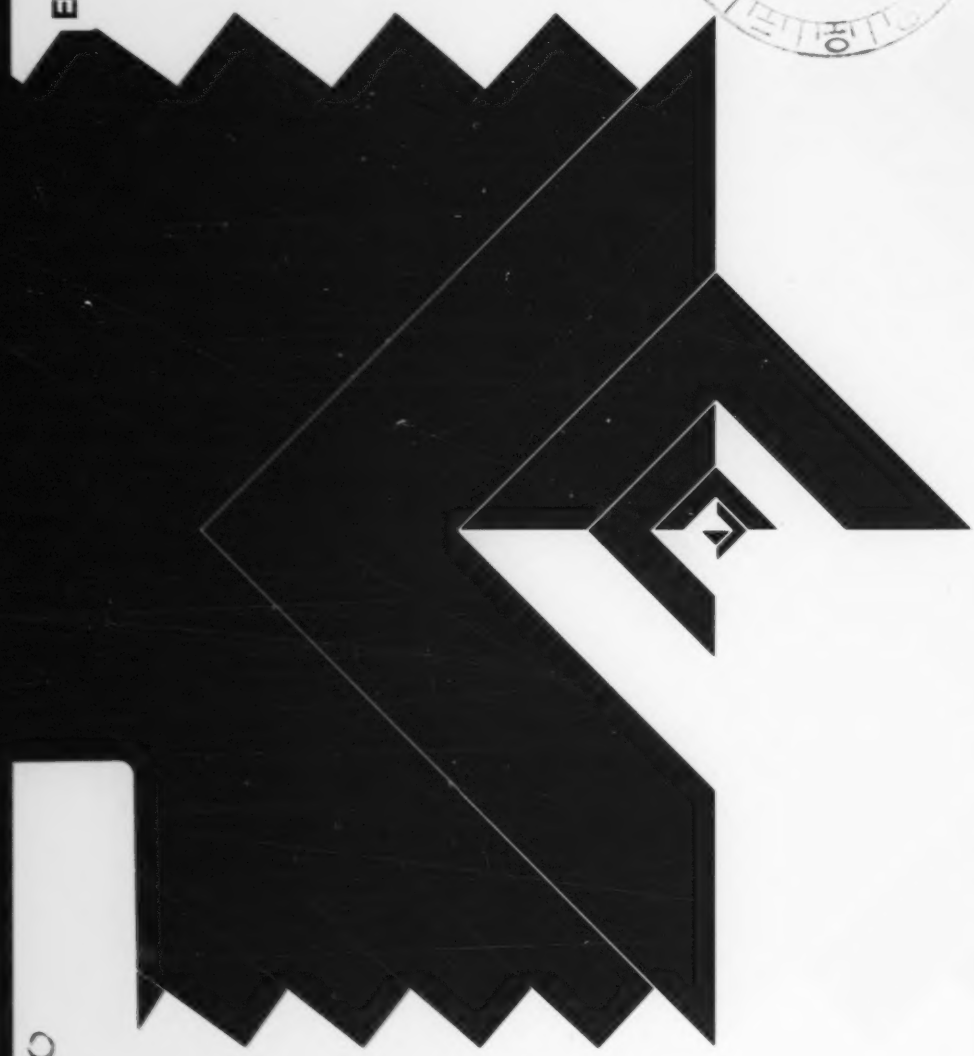

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SYSTEMS AND PROCEDURES EXCHANGE CENTER

# Flyer 200

## 2001: A Space Reality
## Strategies for Obtaining Funding for New Library Space

March 1994

### INTRODUCTION

For library directors faced with fast-shrinking space or with outdated and hard-to-use space, the traditional arguments for justifying their requests for additional space are now complicated by the growing expectations of funding agents–university administrators, boards of trustees, state higher education commissions, and legislators. These agents are increasingly of the opinion that the "virtual library" or "libraries without walls" are fast approaching. Fueled by the prospect of "saving" multimillions of dollars in building costs, these funding agents are seizing upon the very phrases we use in our profession to mean something quite different as they struggle to understand why libraries need more space if there are to be no more books.

In the Spring of 1993, after an ARL director requested copies of library documents that presented recent cases for new space, several ARL directors responded by sending useful materials. Many of the fallacies and facts of the current situation are dealt with in these materials. The continued demand for this information was so strong it has now been collected in this SPEC Kit. Hopefully the information will assist library administrators to shape strategies to enable funding agents to have a clearer picture of the library space issue over the next decade.

### COMMON FALLACIES

***Fallacy I. Libraries will purchase fewer and fewer materials in print form.*** Despite the popular hype in the media, the 1990s will not usher in the end of the printed page as a major communications device among scholars and researchers. In 1991/92, the median number of volumes added (net) by ARL libraries was 57,335 volumes. This approximates the need for an additional 5,800 linear feet of shelving in a typical research library. Book and journal publishing shows no signs of decreasing, and history teaches us that new technologies supplement but do not replace old ones. Writing more than a decade ago, Daniel Boorstin describing this phenomenon as the "Displacive Fallacy," noted that it has not happened that new technology displaces old technology. The manuscript continued as a means of scholarly and creative production for centuries after the introduction of printing; paper took even longer to replace papyrus. The typewriter, candle, pen, pencil, locomotive, and bicycle still play important roles in modern life.

The outpouring of printed scholarly materials, the proliferation of publishing in the third world, and the lack of aggressive investments in and commitments to publishing and distributing works in electronic forms by scholarly publishers, coupled with an outpouring of useful and important works on the Internet and in electronic formats such as CD-ROM, suggests that research libraries will continue to maintain and add to their large print collections for decades to come. Simultaneously, these same libraries will need to maintain and support the use of new scholarly materials in a wide variety of electronic formats.

***Fallacy II. The Library of the Future will soon meet all user information needs and will not require "walls."*** D. Kaye Gapen and James Barker of Case Western Reserve define the "virtual library" as "the act of remote access to the contents and services of library and other information resources, combining an onsite collection of current and heavily used materials in print, microformats, and electronic form, with an electronic network which provides access to, and delivery from, external library and commercial information and knowledge sources worldwide." "In essence," they say, "the faculty member and student are provided the 'effect' of a library which is a synergy created by bringing together technologically the resources of many libraries, information services, and knowledge stores." Central to understanding the virtual library is the notion that it is the responsibility of current research libraries to continue to develop core collections, in a variety of formats, and to utilize simultaneously technology that will facilitate users' access to information regardless of where it is located.

Persons who do not manage libraries take seriously, as if it were happening today, the broad vision of students and faculty sitting in their rooms and offices browsing a virtual reality of shelves of electronic books and finding and using

everything they need, without assistance, through their personal workstations. This vision is predicated on the assumptions that people work alone, that the library is just a place to find the information one wants and from which one takes it away, that faculty and students are sophisticated information users, and that the costs of using this system are insignificant.

Librarians, on the other hand, have nightmares of books piled in aisles, seating removed, new equipment unable to be installed and used, and librarians, staff, and users unable to accomplish their work in the space available. Because it normally takes more than a few years between the time when librarians begin to request new or renovated space and the time when new space is ready for occupancy, many of these nightmares are beginning to be real.

***Fallacy III. Users will no longer need to come to a library facility to acquire the information needed.*** The document from the University of Missouri is unique in its authorship, for it is written by a committee of library users, faculty, and students. The group argues strongly that all library facilities in the future be designed for an "acceptable level" of user space and services and that planning based on projected technological advances must include the costs of operating, maintaining, and supporting use by faculty and students. The equation often proposed implicitly by funding agents usually assumes a shift in the cost burden from the institution to the end-user.

Planning underway by librarians models the intellectual process as an active onsite experience, where technological tools allow the users to reach out for knowledge, wherever it may be located and whatever form it may be in, and to manipulate, compare, and contrast it to other related knowledge. Library space must facilitate the interaction between expert library staff and the user, for it will be well in the future, if ever, that users can operate independently of either core materials in a range of formats or of library staff who teach, assist, and guide users in the most effective ways of identifying their information needs of finding, accessing, retrieving, using, and managing that information.

***Fallacy IV. The need for the Library as a "place" in the academic center of the campus will diminish.*** No respondents think that the library's importance as "place" will diminish in the foreseeable future. The library will continue to serve as a campus social and intellectual commons, a place in which minds of the present interact with minds of the past, and a place for contemplative study and research space regardless of what is available from workstations in offices and living quarters.

## STRATEGIES

It is well understood that funding agencies have limited resources and increasing demands for those resources. It is also well understood by library directors that new information technologies will not instantly replace the need for library space for intellectual or social activities centered around information and knowledge contained in many formats and housed both onsite and offsite. It is also commonly recognized that there will be, for many years to come, onsite working collections of materials core to the work of the faculty and students of the institution. Compact shelving and weeding are commonly cited strategies for reducing the space needed to house a vital collection, which will contain materials in all formats. Key to future needs are space that is flexible, that can evolve along with the process of transformation and a library staff skilled in the tools of knowledge management and user education and training.

Components of strategies for the library of the future include: the library as a place that serves as an intellectual and social commons; accessibility of information, including a core of printed materials; utilization of technology to facilitate access to information; accessibility of expert librarians to assist and train users to identify, find, retrieve, use, and manage information; assumption of the major costs associated with information activities by the institution, not entirely by the end user; and functionally integrated spaces that will link the old and the new.

However close the future may seem, it has not yet superseded the present. As the Mellon Foundation report, *University Libraries and Scholarly Communication* stated, "Whatever promise the new technologies hold, one may be certain that printed scholarly literature will continue to exist for a long time." The library as a physical space will not disappear, and printed books will be with us for a very long time.

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Anthony M. Cummings, et al. University Libraries and Scholarly Communication (Washington, D.C.: Association of Research Libraries for the Mellon Foundation, 1992), p.113.

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***This Kit and Flyer was compiled by Paula T. Kaufman, Dean of Libraries, and Aubrey H. Mitchell, Associate Dean for Access Services, University of Tennessee, Knoxville, and was prepared as part of the OMS Collaborative Research/Writing Program.***

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SYSTEMS AND PROCEDURES EXCHANGE CENTER

# 2001: A Space Reality
# Strategies for Obtaining Funding for New Library Space

A SPEC Kit compiled by

Paula T. Kaufman
and
Aubrey H. Mitchell
University of Tennessee, Knoxville

February 1994

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SYSTEMS AND PROCEDURES EXCHANGE CENTER

# Kit 200

2001: A Space Reality
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March 1994

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# CASE WESTERN RESERVE UNIVERSITY
# MODELING THE FUTURE OF SCHOLARLY COMMUNICATION

**Harnessing Technologies**
**To Unleash**
**Their Potential**

Prepared for Vice-President Raymond K. Neff
by

D. Kaye Gapen, Director
University Library

&

James Barker, Director
Library Collections Services

January 1993

## INTRODUCTION

> "While it is relatively easy to speculate about future developments, it is much harder to know what their effects will be on readers and users, authors, publishing entities, libraries themselves, and other institutional participants in the process of scholarly communication. At issue are not only substantive questions of the quality and quantity of scholarship and of access to it but also mundane but vitally important ancillary issues such as pricing, costs, and financial returns.[1]

For the past five years Faculty Members, Students, Staff Members University Administrators and Trustees have been engaged in establishing the vision of an Electronic Learning Environment —

> "The 'electronic learning environment,' featuring a fiber-optic computer network that has begun to link all members of the CWRU community with each other and with outside databases, is the University's response to the need to introduce advanced information technology onto the campus to support teaching and research efforts as well as administrative functions....
>
> "The University is committed to the design and development of a learning environment that does away with the traditional separation between library and computing services, capitalizes on resources for creating and sharing information, embeds these new resources in the curriculum, and delivers them to students throughout the campus--even in their residence halls."[2]

The commitment to this enabling vision has been reinforced by a multimillion dollar investment and an organizational commitment of CWRU staff.

The experiences of these five years have resulted in the description and application of a series of models and examples which provide the foundation for responding to the patterns of scholarly communication in teaching, learning, and research which are showing significant shifts. Five years of practice, visualizing, and experimenting are revealing new modes of thinking and communicating which are complementing historical scholarship.

"Complementing" is a key concept in establishing an effective foundation.

> "The early history of electric media is less the evolution of technical efficiencies in communication than a series of arenas for negotiating issues crucial to the conduct of social life; among them, who is inside and outside, who may speak, who may not, and who has authority and may be believed... New practices do not so much flow directly from technologies that inspire them as they are improvised out of old practices that no longer work in new settings."[3]

---

[1] "University Libraries and Scholarly Communication, Andrew W. Mellon Foundation, 1992. Forward. (From the ARL Bimonthly Newsletter of Research Library Issues and Actions, Nov. 23, 1992, p.1)

[2] Plan for Case Western Reserve University 1990-1995, p. 20.

[3] Marvin, Carolyn, When Old Technologies Were New: Thinking About Communicartion in the Late 19th Century (New York, Oxford University Press), p. 4-5.

We are not looking at transplantation or replacement — rather we are viewing the early stages of a transformation. Our libraries, our information systems, our buildings, and our supporting staff members must provide "Bridges to the Past and Gateways to the Future." Our overarching goal is to devise the budgets, the techniques, the tools, the models, and the sensitivities to support each iteration of the transformational process.

With each iteration, we gain more skill in looking ahead to the future patterns which we may only glimpse now. As members of the Campus Community, we continue to strengthen the solid foundations, design new systems, map out new experiences which we want to foster, refine the models, and begin the next cycle of change.

**Enhanced Models of Service: the University Library**

Based on the work of the Library Staff Building Committee and the results of the User Information Survey and subsequent development of the Information Use Environments, it became clear that it would be necessary to develop new models of services. These new service models create an information system which is more self-explanatory, allowing precious limited resources to be channeled to other activities such as analysis and interpretation of information, interface and tool design, and problem solving. The analysis and design of service models addresses the Library of the Future Committee's recommendation for ongoing output measures for the Library of the Future.

The new models of services are characterized by integration, as opposed to the discreteness common to the classical library paradigm. The first type of integration which will continue is the vigorous development of the virtual wing of the library, i.e. the continued fusing of the physical library, the electronic learning environment, and the network. This will allow for an expansion of services via various remote components and the maximum utilization of machine technology to free more staff and user time for higher level information activities such as analysis of information or interface design.

The second type of integration which will occur will involve the management of the many types of collections available to the CWRU community: onsite and remotely housed print and non-print collections and various remotely accessed digital sources. Toward a seamless integration of these, the resources of collection management and access services will begin to merge and the tools by which the collections are accessed will move toward a more unified and sophisticated front-end. A new bridge between scholars and librarians—knowledge management–will become an increasingly important component of the research library, allowing collection resources to be focused on self-identified user needs.

The third type of integration which must occur will involve the reorganization of University Library. The traditional rigid departmental boundaries of the library will give way to a more flexible form of resource management in which various types of expertise can be brought to bear on problems in a rapid and flexible manner. Task-orientation will be replaced with problem-solving.

**FreeNet**

FreeNet is the name given to a diverse but related set of information services. As its name implies, FreeNet access is provided without charge to subscribers of the service. Of equal importance, FreeNet services are available to both the public as well as to members of the CWRU community.

FreeNet provides a broad set of services; even so, new services are introduced into the CWRUnet systems on a daily basis. There are literally hundreds of bulletin boards and services provided via FreeNet; a small sample includes:

- Electronic mail
- Software distribution
- Headline News
- Supreme Court Decisions
- Regional and national library access
- Special Event News (e.g. Campaign '92)
- Medical Information Bulletin Boards

In addition, FreeNet provides a number of Forums that permit multiple users to interact with one another. Users may select the Forum in which they wish to participate; once

attached to the Forum, the user may read and respond to the ideas of others users of the Forum. This facility of FreeNet encourages the lively exchange of ideas and enables academic activities such as brainstorming, collaborative writing, and group discussions.

Aside from the many services provided, FreeNet serves as a telecomputing laboratory where issues are tested and evaluated. Telecomputing research objectives are:

1) To provide a place where non-proprietary research can be conducted into telecomputing as a new communications and research medium;
2) To develop educational programs and materials designed to increase the understanding and use of telecomputing systems in general, and community computer systems in particular;
3) To explore new and better ways of delivering computerized information and communication services;
4) To assist in the further development of the Cleveland FreeNet and in the dissemination and support of free, open-access, community computer systems in other cities around the country.

**Information Services: Present Organizational Commitment**
The Information Services Division of CWRU has a substantial organizational commitment to the development of electronic library materials and services. The division is headed by Vice President Raymond K. Neff. The division has been organized in such a manner as to permit specialization where desirable but to also encourage strategic joint development projects.

There are a number of units within Information Services actively involved in the development of the electronic library. The primary units are:

University Libraries
The University Libraries comprise the Health Sciences Library, the Allen Memorial Library, the Law Library, the MSASS Social Work Library, and the University Libraries (Freiberger, Sears, Music, and Astronomy libraries). University Libraries have primary responsibility for supporting and delivering scholarly information to faculty and students. In consultation with the Vice President of Information Services, University Libraries develop strategic plans and directions for the delivery of scholarly information to the campus community.

The staff of University Libraries meet on a regular basis with faculty and students to determine existing and future information needs. These needs are documented and various delivery models are proposed and evaluated using a formal methodology.

The staff of University Libraries also maintains a thorough knowledge of new services or directions at other research libraries. In this capacity, the staff of University Libraries insures that CWRU's strategic directions are consistent with evolving and new technologies and standards as they are introduced.

Library Collections Services
The Library Collections Services unit (LCS) performs applied research and prototype application development of computer based systems to manage and deliver electronic information resources to the library staff, faculty and students. The University, in cooperation with IBM Corporation, has made substantial investments in developing a knowledgeable staff and in state-of-the-art equipment acquisition.

Staff of the LCS project have developed applications to capture, store, retrieve, display, and manage intellectual properties maintained in electronic form. The LCS staff also works directly with faculty and library staff members to develop prototype delivery applications.

**Library Information Technologies**
The Library Information Technologies unit (LIT) has primary responsibility for maintenance and enhancement of the University's OPAC systems. This unit coordinates activities on the CWRU campus with statewide OhioLINK initiatives.

The LIT unit maintains and enhances the CD-ROM and software library server systems. These systems provide shared access to CD-ROM information systems acquired by University Libraries.

The LIT unit also maintains the Software Library services. These servers provide for shared access to software packages used by faculty and students.

**Computer Support Information Services**
The Computer Support Information Services unit is the primary microcomputer support group for faculty, student, and staff microcomputer systems. This unit is also responsible for providing statistical application development for faculty members.

This unit works directly with faculty members to develop hardware and software recommendations. The unit also provides both onsite and telephone problem resolution support services to faculty and staff. The unit also acquires or secures educational services for microcomputer users.

**Information Network Services**
The Information Network Services group is responsible for the installation, maintenance, and enhancement of CWRUnet and FreeNet Services. Under the direction of the Vice President, the unit develops and installs CWRUnet services on-campus and works to enhance off-campus access to information resources.

**Instructional Specialists**
Information Services has funded a number of positions within selected academic departments to review, develop, and introduce application systems into the curriculum. The Instructional Technology Specialists work in the academic departments with dual reporting responsibilities to both the Vice President of Information Services and to the Chairman of the academic departments. In these positions, the ITS' are in daily contact with the faculty and the students and develop and evaluate programs on an ongoing basis. ITS staff are currently placed in Mathematics, Physics, and Chemistry Departments.

A liaison position has been established with the faculty of Arts and Sciences. Other faculty members in Music and Medicine have been given joint appointments in their respective academic departments and Information Services to articulate and direct application development for those departments.

**KIMS Conceptualization**
(See Graphics Section for Chart)

**Introduction**
The Knowledge and Information Management System (KIMS) is created by bringing together software and hardware to support the storage and retrieval of information and knowledge from the CWRU system and from connections to national and international

information and knowledge resources. The KIMS incorporates the present on-line library system (including the public catalog), digitized bibliographic tools, the full-text of monographs and journals, and digitized images of non-textual resources (slides, photographs, sound-recordings, art objects, etc.).

The "hot spots" on the chart in the Guidebook indicate those areas where librarians will join with programmers and system designers to design and create specialized aspects of the KIMS, including the umbrella searching mechanism and interfaces which incorporate the newest types of retrieval capabilities such as natural language searching and artificial intelligence.

A significant aspect of the KIMS is that only one retrieval language must be learned in order for users to search information and knowledge in a variety of resources and formats. This "umbrella searching mechanism" displaces the multiple searching mechanisms necessary now when multiple databases are searched in separate systems. On the other hand, the KIMS can support a variety of user interfaces, including menuing systems or icon-driven searching.

A further major KIMS capability is its flexibility in encompassing the variety of vocabulary control and thesaurus mechanisms which are unique to each Virtual Library and User Information Environment.

It is clear from articles such as those in the Library Trends issue on "Intellectual Access to Graphic Information"[18] that standard cataloging and classification tools such as the Anglo-American Cataloging Rules 2 and the LC classification tables are no longer sufficient to organize and retrieve the massive files of text and images which will comprise the KIMS. Information Science and System Designers are developing newer, more powerful, and individually tailored approaches to retrieval which we will incorporate in the KIMS.

The massive storage and retrieval capability will be linked to CWRUnet so that the information and knowledge resources are available throughout the CWRU campus network and via dial-up modems through FreeNet. The KIMS structure will integrate microcomputer software for information processing and knowledge synthesis, including software capabilities for data manipulation and decision-making.

The KIMS will manage the storage, retrieval, and delivery of "compound documents;" i.e., volumes which can include text, pictures, charts, graphics, and even sound. Sophisticated scanning equipment will permit the digitizing of such compound documents. Desktop publishing software will permit the printing of compound documents gathered through the KIMS.

**Knowledge Management**

Traditionally academic libraries have acted to identify, access, and deliver the materials they housed in support of their institution's curriculum, faculty, students, and staff. Ownership was virtually the only guarantee of access and the library acted partially as a warehouser of containers of knowledge. Printed indexes, abstracts, bibliographies, study guides, etc. all provided access to those various containers. With the advent of electronic technologies a new tool for managing information resources emerged— a tool with "transforming" potential. Electronic technologies not only can perform many of the labor

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[18]"Intellectual Access to Graphic Information" in Library Trends, Spring 1990, Mark E. Rorvig, Issue Editor, p. 640.

intensive tasks associated with accessing and tracking "containers of knowledge," they are capable of breaking down the barriers of containers and permitting an intellectual access not possible with other kinds of technologies.

It is now possible to digitize all kinds of information including images, photographs, sounds, text, and animation. Computers can store anything that can be digitized. This digitized data can be structured to allow for very focused, detailed searching. Librarians can design intellectual control mechanisms to allow scholars to retrieve a wide range of materials directly applicable to their research and teaching. These intellectual control mechanisms do not force the scholar to utilize the information in whatever form it originally appears in the "container," but allows the scholar to derive individual views of the data that directly pertain to the scholar's work. The system that brings together the hardware, software, control mechanisms, on-line resources, and human expertise and makes them available to scholars is known as Knowledge Management (KM).

Knowledge Management is a means by which librarians can help scholars and universities retain control of the intellectually generated property that is their most precious and valuable commodity. It is a way of structuring new works as they are created, so that they are maximally accessible and a way of accessing existing resources to enable the highest level of integration with the scholar's work, helping to create new knowledge. Knowledge Management environments consist of:

- complex, high quality, dynamic databases that are critical to daily work;
- integrated electronic systems and services;
- on-line tools to collaboratively build, maintain, share, and use databases;
- interface tools for access to multiple local and remote databases.

Some of the examples of types of on-line tools available for use in KM systems include:

- editing tools
- graphics tools
- database management tools
- analysis tools
- peer review tools
- authoring tools

Successful Knowledge Management environments require that the databases constructed consist of data that is critical to the given scholarly community and that the scholarly community form vital alliances with the librarians. We have begun to lay the foundation for Knowledge Management in the creation of the Virtual Libraries.

Knowledge Management is defined most fully by Richard Lucier. Lucier outlines his library's reorganization (University of California at San Francisco) into two major subdivisions: Information Resources and Services, and Center for Knowledge Management. The Information Resources and Services division is described as handling "more traditional library functions" while the Center for Knowledge Management implements the beginning of what will be a major shift in services. Lucier describes the existing cycle of scholarly publishing and notes that the practice of knowledge management insinuates the library, through its staff members, into the cycle at the very beginning, rather than the end of the process. In addition to shifting the libraries' role in

the cycle, knowledge managemnt shifts the university's role in controlling key intellectual resources.[19]

KM encompasses both the intellectual structuring of information and knowledge synthesis.

**Intellectual Structuring of Information:**
Intellectual structuring has to do with the "processing" or ordering, arrangement, organizing, etc. of information to allow for intellectual access. This intellectual structuring allows for the storage, retrieval and communication of information regardless of its format. These technologies to date have been driven by the way given formats convey the information they contain and by the way the users structure and use their information. We choose to refer to the components of this structuring as "intellectual technologies." Intellectual technologies facilitate the retrieval of recorded materials and are not common only to electronic information retrieval, but have been an important part of "retrieval" for a very long time. Some common examples of intellectual technologies include classification schemes, the development of controlled vocabularies and thesauri, indexing, abstracting, searching logic, etc. The process of alphabetizing is one of the most frequently encountered forms of intellectual technology and has become so common as to go unnoticed. Intellectual technologies are critical to enabling intellectual access because "intellectual technologies provide the systematic means of narrowing the information universe to a set of data and information which has some probability of containing the information that is wanted and needed."

In terms of the user-framed, value added model, intellectual technologies add value to the information system from the users' point-of-view, usually by facilitating the retrieval of information. However, intellectual technologies may also reveal important facets of information, such as logical relationships, in the case of a thesaurus which would show the broader, narrower, and related relationships among concepts. These intellectual technologies add value by giving the user clues as to where information would be found, where additional or related information might be found, not just in one specific item, like a book, but in any system where similar intellectual technologies are found.

Within the steps to designing a user-framed, value-added information system, the analysis of the users' information environments produces a set of information needs. These information needs can be translated into information specifications. The information specifications can be matched with the intellectual technologies best suited to meet them. The intellectual technologies are then translated into *inputs* for the system design based on the established needs of the users and the problem dimensions of the users. (These *inputs* are often referred to as information technologies, which concern the technologies of information storage and retrieval.)

**Knowledge Synthesis**
Knowledge synthesis is the process by which the user literally or figuratively "lays on the table" all the compiled data gathered in a search and constructs his/her own "picture" of what it all means. The user may do so along pre-established lines, that is, accept a series of conclusions already drawn, but true synthesis involved the "re-expression" of concepts through the perception of the individual user. To accomplish this synthesis, the user may breakdown and reconfigure information in a way very different from its original presentation and in a way not particularly suited to the physical format of information. This is a very intellectual process and very individual, but it usually involves some kinds

[19]R. Lucier, op. cit.

of evaluating, clarifying, testing, and validating processes. Often these processes serve to clarify the nature of relationships among component parts of the concepts the user is trying to explore. It is suggested that knowledge synthesis is vital because it helps the user develop an individual conceptual map of his/her world, giving the user an enriched sense of their environment and a clearer idea of how ideas, processes, cultures, organizations, etc. relate to the user, to one another, and to the rest of the world.

The most vital tool of synthesis is the mind of the individual user and their individual ability to mentally perform the processes related to knowledge synthesis. One of the most enduring obstacles to this process has been the limitations of the physical containers of knowledge as well as the barriers of time and space that may separate the user from the needed material.

One of the powerful promises of technology is to defeat the barriers of the container, time and space. In addition to removing those deterrents, informational technologies that reflect user needs would also assist the user in the synthesis process by enabling access and manipulation of information in a way never before possible. What we said in our program statement was "the tools the user employs... will think with the user, modeling and simulating, engaging all the user's senses as part of the process of synthesizing knowledge." Successful knowledge synthesis not only confirms the information gathered by the user in a very strong way, but it often results in new knowledge, when a user sees a new relationship or a new consequence of an existing relationship among data.

One of the hallmarks of knowledge synthesis is the ability to *integrate*, the ability to bring the bits and pieces of data together as the users' thought processes dictate, and to do so when the mediums delivering the data differ from one another. Knowledge synthesis is aided by the ability to model and test various scenarios by changing variables.

**The Library of the Future (Smith Library as the Virtual Library)**
(see also the Classical Library in the Guidebook)
The library we will build, the Kelvin Smith Library, the library of the future, models the intellectual process as an active, onsite experience, where technologically-driven tools allow the users to reach out for knowledge, wherever it may be, whatever form it may be in, and to gather that knowledge with tools that will record it and allow it to be manipulated, compared and contrasted to other related knowledge and thus, to facilitate synthesis.

The most important element of the floorplan is how users are brought into proximity with the world of knowledge and how the space facilitates the interaction between library staff and the user. For quite some time into the future, it will be important to allow easy and convenient access to a working collection, but that working collection will include a range of material formats, some located onsite and housed in traditional compact shelving, but many of the resources in the working collection will also be in a digitized format, available all across the network infrastructure.

The vital components of the library of the future will be: intellectual access to information and knowledge resources in all formats, a networking infrastructure to act as transmission highway, workstations that feature hardware and software to facilitate online access and manipulation of the gathered knowledge, library staff skilled in the tools of knowledge management, interface design, and user education, adequate and varied training facilities for both users and staff, a variety of flexible user spaces that can evolve along with the transformation process, and a vigorous and viable working collection that supports teaching and research.

The boundaries presented by these elements are formed only by our understanding of the concepts and the evolution of the transforming tools. A user can choose from physically accessible, onsite materials, but the user is not limited or bounded by physical location of material or its format, in fact, wherever the user can access the tools of online access and the expertise of knowledge management, the user can access the resources of the library of the future.

The staff of the library of the future are highly visible, active collaborators in the process of knowledge management, and much of their work is constantly evident to the users in the form of interfaces designed to overlay digital resources. These digitized resources are organized by thought processes and the tools the user employs to manipulate them will think with the user, modeling and simulating, engaging all the user's senses as part of the process of synthesizing knowledge.

The new knowledge that emerges will already be in a format that can be managed and transported. Thus as the classical library offered physical access, the library of the future complements physical access with intellectual access and the ability to facilitate knowledge synthesis. Instead of a hallmark of discreteness, the library of the future offers integration as its enduring theme–integration of formats, integration of knowledge, integration of user spaces, integration of library staff.

We are equating the Smith Library with the Virtual Library. The Virtual Library is defined as the act of remote access to the contents and services of libraries and other information resources, combining an onsite collection of current and heavily used materials in print, microformats, and electronic form, with an electronic network which provides access to, and delivery from, external library and commercial information and knowledge sources worldwide. In essence, the faculty member and student are provided the "effect" of a library which is a synergy created by bringing together technologically the resources of many libraries, information services, and knowledge stores. In the library profession this type of library is currently labeled the "virtual library."

To maintain its flexibility and consequently its vitality to future generations, the Kelvin Smith Library will differentiate spaces by what the spaces offer and what activities primarily occur there, but underlying every kind of space will be the notion that the primary concern is that of the user's relationship with the world of knowledge. To facilitate that relationship, one must be able to move easily between formats, between information and knowledge, between individual and group thinking, between floors, so that the entire building is taken as a whole.

We have a particular challenge and opportunity in programming the Smith Library to respond to an intellectual environment which is in the process of transformation, and in its role as a virtual library. We have, therefore, given very careful consideration to the balancing of major space assignments in the Smith Library Program.

**The Library of the Future Committee**

**Executive Summary**

The Committee on the Library of the Future, appointed by the President in April 1990, was asked to develop long-term (20-year) goals for the evolution of campus library services and to prepare a functional program for a new library facility. Over a period of nine months the Committee sought opinions from the University's faculty, students, and library staff on their needs, expectations, and priorities for library services. After

reviewing the information gathered from the University community, as well as the advice of three library consultants, the Committee makes the following recommendations:

***Primary Recommendations***

- The Library of the Future should include a place which serves as an intellectual and social commons of the University.
- The resources and services now encompassed by the University Library should be integrated into the new central library facility.
- The primary measure of success for the Library of the Future is accessibility of information for faculty and students.
- Investments in the Library of the Future should be directed at increased accessibility.
- The Library of the Future should have an expanded role in the instructional and research activities of the University.

***Related Recommendations***

- The Library of the Future and the University Bookstore should collaborate in meeting the intellectual and information needs of the University's faculty and students.
- The Library of the Future should increase its ties to the community.

***Short-Term Issues and Recommendations***

- There should be an ongoing process for facilitating faculty and student input to the libraries and keeping the campus apprised of the libraries' response.
- The directors of campus libraries, in collaboration with this Committee, the Senate Library Committee, and the appropriate academic units, should undertake discussions about how to evaluate the effectiveness of the Library of the Future.
- This Committee will work with other University committees and academic units to define the concept of a core collection, to include issues related to size, composition, and implementation.
- The directors of campus libraries should review policies and services for internal consistency.
- There should be additional discussions about the instructional role of the libraries.
- The Provost and academic deans should establish a mechanism for ongoing involvement of the library staff in academic planning.
- A process should be created to explore collaborations between the libraries and the University Bookstore.

The Committee invites comments on this report, either in writing or at one of the open meetings with the University community in April. The release of this report does not end the dialogue with the campus about libraries, but rather completes one phase in a process that will continue for at least another year as the Committee works with an architect to develop a program for the new library facility. Committee members also hope that a means can be established to continue on an ongoing basis the discussion about libraries that has started with the work of this Committee.

***Committee Members:***

Scott S. Cowen, Dean, Weatherhead School of Management, *Chairman*
Karen H. Bingham, Acting Director, University Library
Robert G. Chesheir, Director, Cleveland Health Sciences Library

Laura B. Chisolm, Professor of Law
Barry D. Lindley, Associate Dean for Medical Education
Karen L. Milchus, Graduate Student, Biomedical Engineering
Lucia S. Nash, University Trustee
Raymond K. Neff, Vice President for Information Services
Sandy Kristin Piderit, Undergraduate Student, Mathematics
Carroll W. Pursell, Davee Professor of History
Sandra W. Russ, Assistant Provost and Associate Professor of Psychology
Lee J. White, Professor and Chairman, Computer Engineering and Science
Wojbor A. Woyczynski, Professor, Mathematics and Statistics

*Other Participants:*

Frank R. Borchert, Vice President for Budgets and Planning
Dennis A. Risen, Special Assistant to the Vice President for Information Services (for Library Planning)

*Committee staff:*

Jean Gubbins, Staff Assistant, Office of Public Affairs

**Charge to the Committee**

The Committee on the Library of the Future was appointed by President Pytte in April 1990 to advise the President, Provost, and Board of Trustees on University-wide needs for library services and on the proposed new library facility. More specifically, the Committee's charge was to (1) develop a conceptual statement for University-wide library services for coming decades, and (2) prepare a functional program for a new library facility, in the context of the goals for campus-wide library services. President Pytte told Committee members that they should not feel constrained to follow existing structures for providing library services. While the Committee was asked to take a long-term view, the President also noted the need to build on the current strengths in order to upgrade facilities and services in the short term as well.

Some of the parameters to guide the Committee's work were outlined in the statement "Library Services and Other Scholarly Information Resources for Case Western Reserve University," Appendix A, issued by the Office of the President and distributed to Committee members at the time of their appointment. Committee members also reviewed the report of the Conference on the Library of the Future that was held on the CWRU campus in September 1989. A summary of conclusions from the conference is included as Appendix B of this report.

**Medical Textbook & Medical Syllabus**

This project which is part of the IBM/CWRU Joint Research & Development effort will evaluate the effectiveness of placing textbook materials online for student use. Medical School students receive all required reading materials in the form of a printed 6,000 page syllabus created by the faculty. This document contains numerous references to other materials held by the Health Sciences Library and faculty members. Availability of these materials is limited and the goal of the project is to provide improved student access to these materials.

The Medical Reference prototype uses Roitt's Immunology published by Gower Publishing of London, England. This reference is popular with the students because of its textual content and because of the many high quality images.
To further enhance the value of the text, the publisher provides 35mm photographic slides for all images printed in the text. The source materials for the prototype consisted of the textbook and slide set. Permission was received from Gower Publishing to use their text and slide materials in this project.

Textbook pages were scanned using a flatbed scanner. Text areas of the pages were processed through an OCR package and corrected as necessary. The resulting text file was tagged using standard GML and processed with BookManager Build application to create a file suitable for use with the BookManager Read application.

The images from the text were also scanned. Due to limitations in the publishing process, the resolution of these scans is rather modest. As a supplement to these preview images, the slide set was scanned at higher resolutions. In both cases, images were captured using 8 bits of color and are presented on 1024 x 768 or higher resolution monitors.

A prototype version of the BookManager Read product is used to present the book. This version of BookManager allows areas within the text to be hyperlinked to external programs. Figure captions serve as the hyperlink points.

As in the case of the MusicalScores application, the user begins by selecting a menu option. Once selected, the text is loaded by BookManager Read onto the user's microcomputer and displayed for use. Users may browse the text or skip directly to specific sections using BookManager's electronic Table-of-Contents. All standard BookManager features (e.g. text searches, glossary lookup, margin notations) are available for use.

Students have full access to the text and may use it as needed without displaying images. This method of presentation is particularly effective when the book is used as a textual reference tool. Students may request that an image be displayed by simply pointing and clicking on the caption of the image they wish to retrieve. When image presentation is requested, the preview image is retrieved from the library and presented in a separate window. In many cases the preview quality images are sufficient for student needs; however, if higher quality images are needed they may also be retrieved from the repository.

Because the images are presented in separate windows, it is possible to have several images displayed simultaneously. This feature proved to be very valuable because it permits the direct comparison of two or more images that may appear on different pages of the original text.

The Medical Reference application has been demonstrated to several faculty members and has been positively received. At this point, the more challenging project to completely convert the existing syllabus and all reference materials is being prototyped.

**OhioLINK**

CWRU became one of the two private universities to participate in the Ohio Board of Regents program for the creation of library linkages among state-supported universities in Ohio. The resulting program, OhioLINK, has an ambitious agenda for the next several years which has begun with the selection and gradual implementation of an integrated, computerized library system in each of the participating institutions. CWRU was included in the first phase of implementation, with the system installed in June/July, 1992, following more than a year of planning, decision-making, and general preparation. Further OhioLINK developments will encompass, for example, the availability of on-line databases, document delivery, central database access to library information created at each local institution, shared collection development, and so forth.

**Pathways Committee: Library Futuring**
(See Graphics Section for Chart)
The Pathways Committee, appointed by the Director of University Library in October of 1991, was asked to explore "new tools, new formats, and new patterns of scholarly communication which have implications for the functions and decision-making required to support the Library of the Future."[20] The committee was further charged with recommending the steps required to sustain the present essential value-added services, modify the present in the light of the future, and to begin new value-added services and programs. Specifically, the committee was asked to evaluate the changing patterns of scholarly communication, intellectual technologies, and informational technologies, and to recommend the path the staff would need to follow to prepare themselves for the opening of the Kelvin Smith Library. The group submitted an interim report in February 1992. (Please see the Guidebook for the diagram which provided the initial focus for the Pathways Committee)

As part of its findings to date, the Pathways Committee identified some major trends that stated in part that the world would be changing for librarians, specifically that some major shifts would occur. The shifts included:

- Shifting infrastructure, requiring major changes in organizational structure, training, management skills, etc.

- Shifting services, including the delivery of information and management of knowledge so as to promote knowledge syntheses, increased access to static and moving images, copyright advice, database design, interface design, etc.

- Shifting skills for librarians, including system designing, prototyping, educating, etc.

The Pathways Committee also suggested that user demands would require flexibility, enhanced communications, decision-making skills, problem-solving skills, and an overall integration that was simply not possible in our present, traditionally hierarchical system.

In 1992/93, the Pathways Committee was subdivided into six subcommittees, each of which is charged with developing a plan of action in a key activity which is integral to the creation of the Knowledge Management Environment: 1) Multimedia, 2) Virtual Library, 3) Training On-Site & Computerized, 4) KIMS, 5) Electronic Reserve Room and Intellectual Property Rights, and 6) Multiplatform, Multimedia Workstation.

**Printers and Electronic Publishing**
Although the on-line presentation of electronic materials via CWRUnet offers the most powerful and flexible set of presentation options, the ability to deliver materials in printed and portable digital format is also desired. To address this requirement, a variety of alternative publication services are needed. These services include central and distributed printing capabilities, file download capabilities, publication in CD format, image export for printing capabilities, photographic film recorders, and Fax transfers. In each of the following cases, a rights monitoring system is required to insure that the agreements between the University and the rights holders are enforced.

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[20]The Committee on the Library of the Future, appointed by President Agnar Pytte in April 1990, was asked to develop long-term (20-year) goals for the volition of campus library services and to prepare a functional program for a new library facility.

**Printing**
Printed copies of the digitized materials are frequently required or preferred by students and faculty members. In addition to the portability and familiarity of paper documents, reading long documents from a VDT monitor can be somewhat fatiguing. A hierarchy of print services must be provided.

- Individuals desiring to print a limited number of copies of one or only a few pages of materials may prefer the convenience of printing materials directly at their locations. Many students and faculty members have either personal or shared printers to provide this service.

- Larger quantities or materials requiring specialized printer capabilities, such as the production of color prints or transparencies, suggest the use of shared, distributed print servers. Most academic departments have a shared black and white printer adequate for many of these needs. Distributed printers have also been installed in a number of Student common areas for this purpose. Specialized printing, such as color prints, is available within some academic departments or within the Library Collections Services department.

- High volume or special handling situations, (e.g. custom binding, oversized paper, tab insertions, and multi-color stock) require a large, multi-function print services. Publishers are very concerned with the production quality of materials printed onsite and may require, in some instances, that their materials be printed only on high-end units. Discussions are being conducted with Xerox to evaluate how best to satisfy this need.

**File Downloads**
In many instances, the digital information resources will be used as input to other processing programs. For example, text materials may be included in a word processing document, tabular data may be entered into a statistical analysis program, or an image may be included in a document as an illustration. In these cases, the users may request the digital information to be provided ir electronic file format. To address this requirement, a controlled download capability of the information is available.

**CD Publication**
There are numerous instructional programs under development at CWRU that integrate a variety information resources into a multimedia presentation. To successfully share these materials outside the University, a publication system is needed that permits use in environments without the benefits of the Electronic Learning Environment resources available at CWRU.

CD publication of these materials provides a practical alternative to meet this requirement. CD's can be inexpensively produced, have a large storage capacity, and can be read on many of today's microcomputer systems. CD publication offers a useful way to share and exchange large amounts information. A CD authoring system has been ordered by Library Collections Services to support small production runs and CD mastering capabilities.

**Photographic Film Recorders**
Faculty members frequently require image data to be included in the scholarly papers that they create. They also desire the capability to produce color presentation slides from the materials contained in the electronic library. To meet this requirement, publication via photographic film recorders is needed. A Photographic Film Recorder has been installed in the Library Collections Services department to provide this capability.

See **Docutech Printer** in the Guidebook

**Researcher Connection: Information Storage & Retrieval**
There is a significant amount of research being conducted in information storage and retrieval regularly by faculty members in Graduate Schools in Library and Information Science, as well as by research staff in information industry companies. We have begun to establish cooperative review efforts with proven researchers. For example, at the request of Director Gapen members of the American Society of Information Science are planning a series of sessions on Research Directions in Information Storage and Retrieval for University Decision-Makers. To be included are: Academic Research Trends in Information Storage and Retrieval, Applied Research and Development Trends in Information Storage and Retrieval Technologies; and Decision-Makers Forum: What Should the Research Agenda for Information Storage and Retrieval include?

We will also establish similar cooperative linkages with Information Storage and Retrieval researchers in the private sector.

**RoyaltyManager**
"The CWRU Library Collections Services RoyaltyManager System is the result of a joint study initiated between the IBM corporation and CWRU to develop a comprehensive system of library collections services. The end result of this study will lay the groundwork for the Library of the Future, an on-line multimedia repository.

"Fundamental to the creation, maintenance, and use of an on-line multi-media repository are the issues of intellectual property ownership, protection, and use compensation. The long term success of the Library of the Future is directly connected to its computer systems ability to embrace these fundamental issues.

"The LCS/RM System Fall '92 Prototype will explore fundamental library functions relating to the acquisitions, mounting, access, distribution, and use of intellectual properties in electronic form. The prototype system will exercise mainframe, workstation, and network hardware and software, and implement applications designed to control and monitor the access and use of licensed intellectual properties."[21]

**Smith Library Program Statement**
The cumulative analytical results of all the work undertaken by the library staff in conjunction with faculty, students, and administrators, and all pertinent building planning committees was brought together in the Program Statement for the Kelvin Smith Library. Completed in June 1992, the 191 page statement creates a conceptual framework for the building design and articulates important concepts, among them: the hallmarks of the "classical library," the Virtual Library, New and Enhanced Models of Service, the User-framed, Value-added model, the Working Collection, Intellectual Technologies, and Knowledge Management. In addition to important conceptual framing, the document also provides programming premises, the critical need for spatial flexibility and differentiation, space proportions, design goals, scenarios of use, general and technical criteria for the building, space summaries, user seating summaries, adjacency matrices, and individual space descriptions.

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[21] "Library Collections Services/RoyaltyManager System Fall '92 Prototype," October 13, 1992, Library Collections Services, CWRU. LCS CONFIDENTIAL.

**User-Framed Value-Added Analytic Tool**

**Introduction**

UL staff have built upon the value-added model of information systems devised by Robert S. Taylor[22] to evaluate existing services to library users. Using Taylor's criteria that contends that library users are broken down into user groups, (user groups being defined as users requiring distinctive services), those distinctive services were then evaluated using Taylor's categories of usefulness. Services were judged to be useful based solely on what the user found useful, not how well the library performed the services it had chosen to provide. (Please see the Guidebook for a fuller explication of the Value Categories)

The model supports the argument that major input to the design of information systems must come from an analysis of the information use environment — the major input to systems design, complementing the content-driven and the technology-driven models which dominant present design practice. That environment essentially (a) establishes the conditions of information flows into, within, and out of any particular entity; and (b) determines the criteria by which the value of information messages will be judged. The user-driven model is perceived as complementary to the content-driven and technology-driven models which are presently the major inputs to systems thinking and design.

The Model, as implemented in the University Library, will be continually applied to assess the value of alternative processes, policy development, and budget investment — in conjunction with the Economic Models which we will develop concurrently.

**Generic view**

The value-added model consists of:

1. Formal systems (technology-framed)
   (Includes personnel required for design, creation, maintenance, etc.)

2. Set of users

3. Negotiation space (Info mgrs.) (content-framed)
   (How well does the system enable the user to successfully interact with the universe of knowledge?)

All three of the above comprise **The Information System.**

The Information System is to be evaluated and designed from the users point-of-view.

To evaluate and design the Information System, the following must happen:

1. The formal system must be defined.

2. The information environment of the users must be defined.

3. The practices of the information managers must be defined.

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[22]R. S. Taylor, op. cit.

Because the value-added model is user-framed, special attention is paid to defining the users information environment.

**The Model Applied in the University Library**

The Library Staff Building Committee[23] (LSBC) was appointed by the Director of University Library in September 1991. The committee was asked to use the value-added model of information systems devised by Robert S. Taylor[24] to evaluate existing services to library users.

The department heads had hypothesized prior to their evaluation that the *use* of library services and consequently the *value* of library services would differ among users according to their discipline (mathematics versus classical studies, etc.) and their scholarly standing on campus (freshmen versus graduate versus research fellow versus full professor, etc.). The services were described and charted according to Taylor's value categories that consist of Ease of Use, Noise Reduction, Adaptability, Quality, Time Savings, and Cost Savings[25].

At the completion of their analysis, the LSBC found that services the library provided to a wide variety of user groups yielded essentially the same distribution of value categories regardless of the individual activities related to the service, the discipline of the user groups using the service, or the scholarly level of users within the user group. The LSBC also found that the largest share of staff time and effort was spent on activities related to Ease of Use (making the library's services understandable to users) and Noise Reduction (filtering out information chaos so that the user has an understandable set of choices.)[26]

Specific conclusions drawn from the groups' work include:[27]

- The anticipated divergence in values (Ease of Use, Noise Reduction, Quality, etc.) failed to appear despite the fact that the services analyzed were often thought to be tailored to support specific user groups.
- The same values (predominately Ease of Use and Noise Reduction) appeared with the same frequency regardless of the variety of the services analyzed.
- The latter two items suggest that our present systems restrict us. The predominance of values in the Ease of Use and Noise Reduction categories also suggest that our present systems restrict the activities of the staff.
- The unexpectedly high occurrence of Quality values (ranking third after Ease of Use and Noise Reduction) suggests a major staff commitment which can be strengthened and enabled by an information system which assumes some of the Noise Reduction, Ease of Use, Time Savings, and Cost Savings work.

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[23]Chaired by Karen H. Bingham, the group was comprised of University Library department heads.

[24]R. S. Taylor, op. cit.

[25]Sharon Schmitt, "Summary of Background Work for the Kelvin Smith Library" (Cleveland, OH: Case Western Reserve University, 1992), p. 5.

[26]Ibid., p. 6.

[27]Summation of the statistical analysis of the work of the LSBC by D. Kaye Gapen for the Information Services Visiting Committee On Information Resources, December 9, 1991.

- The frequency of occurrence of value groupings was consistent over "families of services" with families of services referring to activities grouped by collection management, reference, etc. types of activities.

- Current service activities are both labor intensive and intellectually intensive, making people the most scarce resource..

- Cost shifts are likely to occur as the service paradigm shifts, but they are probably controllable with careful monitoring.

- Staff resources must be shifted toward the intellectual. For example, Circulation, once thought of as an area of low responsibility, proved to be very high in values of Mediation and Orientation (values from the major value category: Ease of Use) suggesting that in Circulation/ the staff/people interaction is essential with a high level of value and responsibility.

- Staff need to make a shift toward system's design and prototyping, if systems are to assume some current staff responsibilities, freeing staff for more problem-solving type of activities.

- It is suggested that user environments would differ by discipline, but the committee's work is not extensive enough and too internal to proved that data.

**In the future, the model will be applied in the following manner:**
Critical questions for information system design in a user-framed, value-added model:

*Who* acquires, organizes, and transmits *what information*?
By *what means?*
At *what cost?*
To *whom?*
To *what effect?*

Most discussions have always included the first three questions. In a user-framed, value-added model, the last two MUST be answered. They can only be answered by building detailed pictures of the information environments of the user groups who will use the information system and by analyzing the *problem dimensions* of those user groups and the information needs of those user groups. This is a messy, but necessary process at the heart of the user-framed, value-added model.

**Steps for applying the model:**

1. Create a detailed picture of our users by group. This will be done by:

   A. Analyzing the users' information environments

   B. Translating the analyses of those information environments into *information* terms, terms that can have a positive impact on the design of information systems. Positive is defined as useful to the user. These translations must tell us things like: What kinds of information are most useful? What structures of information are most useful? What displays and outputs of information are most useful? What methods for delivery information are most useful? Which of the latter can be most useful in enhancing a particular user environment?

C. Producing *information specifications* for the design of the system based on the translations.

D. Designing *intellectual technologies* best suited to answer the information specifications. Examples of intellectual technologies include: alphabetizing, indexing, abstracting, vocabulary control, searching logic, decision support design, etc.

NOTE: Users' information environments are dynamic.

2. Create a detailed picture of our formal systems (all elements);.

3. Agree on a set of value-added processes.

4. Decide if and how the current system activities add value to the users and how the activities listed enhance the users' information environments.

5. Rank in priority order the items from those activity lists that add value and enhancements.

6. Conceptualize services, new or enhanced that will further add value and enhance user information environments.

7. Calculate the cost of providing each of the value added services.

8. In conjunction with the user group, rank in priority order, what services the group values sufficiently to pay for.

9. Record all findings to date, review those findings with appropriate parties, and seek consensus.

10. Define the human and technological constraints to desired value-adding and enhancing processes so that we acknowledge that some products and services we need to provide cannot be made immediately available.

11. Produce a list of products and services that add value and enhance user environments and for which no human or technological constraints currently exist.
    Use this list in the priority order established.
    Use the list as a way to plan resource allocation.

12. Design the logical model to hold those services.

13. List the functional specifications that will produce that logical model.

**Taylor's Value-Added Categories**

**EASE OF USE** (reduces difficulty in using system)
Browsing: capability of system to allow user to scan an information neighborhood with the probability that user will serendipitously find information of value.

Formatting: physical presentation and arrangement of data/information in ways that allow more efficient scanning and hence extraction of items of interest to user. (standardized displays, highlighting, graphics)

Interfacing (capability of system to interpret itself to users)

Mediation: means used to assist users in getting answers from the system. (ranging from see and see also references to human help)

Orientation: means used to help users understand and gain experience with the system and its complexities.

Organizing: value added by initially dividing/organizing body of subject matter by some form of gross ordering; makes body of information easier to use. (alphabetization, subject division)

Physical accessibility: process of making access to information stores easier in a physical sense.

**NOISE REDUCTION** (subject/content-based)
Access (values added by intellectual technologies that provide systematic meanings, based on subject matter, of narrowing information universe to a set of data/information that have some probability of containing material that is useful. Different kinds of intellectual access provide different sets of the subject universe. Occurs at *output* end. Exclusive process, i.e. restricts or contains amount of information presented.)

Item identification: value achieved by the identification of any information chunk or discrete piece of data by systematic physical description and location information. (the citation)

Subject description: provision of subject description through addition of access points such as index terms, descriptors, and names.

Content summary: result of processes which reduce or compress large amounts of information into compact items.

Linkage: value added by providing pointers and links to items, sources, and systems external to the system in use. Inclusive process, i.e. assures nothing of values is omitted. Expands information options; is usually supplied by people.

Precision: capability of system to aid users in finding exactly what they want by providing signals on such attributes as language, data aggregation, sophistication level, or by ranking output. Assures that if something can be defined, only that information is presented. *Subject oriented*; occurs at *output* end.

Selectivity: value added when choices are made at *input* point of system based on appropriateness and merit of information chunks to user population served. Reduces amount coming into system. Requires continuous filtering of information already in system.

**QUALITY** (intangible values)
Accuracy: value added by system processes that assure error-free transfer of data/information as it flows through the system and is eventually displayed to user.

Comprehensiveness: value added by completeness of coverage of a particular subject.

Currency: value added by 1) recency of data, and 1) capability of system to reflect current modes of thought in its access vocabularies.

Reliability: trust system inspires in users by its consistency of performance over time.

Validity: value added when system provides signals about the degree to which data/information presented to users can be judged as sound.

**ADAPTABILITY** (*problem-oriented*; the measures and investments made by system to strengthen responsiveness to problems users have in their environments. Related to how and why something is needed and how well system responds; usually added by humans.)

Closeness to problem: activities that meet specific needs of specific person in specific environment with particular problem.

Flexibility: capability of system to provide variety of ways and approaches to working dynamically with data/information in a file.

Simplicity: value achieved by presenting the most clear and lucid explanation, data, method, or hypothesis from among a choice.

Outreach: those activities that may not be directly supportive of its primary mission, but which assume importance in establishing a presence in community and which encourage use of the system.

TIME SAVINGS: perceived value of system based on the speed of its response time.

COST SAVINGS: value achieved by conscious system design and operating decisions that save dollars for user; real dollars saved.

**User Information Environments Analytic Tool**

Introduction

The University Library User Survey Committee,[28] appointed by the Director of University Library, was asked to explore how faculty, students, and staff gather information to determine what impact different information seeking behaviors might have upon services and programs as we plan for the programming and construction of the Kelvin Smith Library. Over a period of three months, the committee sought the opinion of the campus community by conducting face-to-face and group interviews. (Please see the Guidebook for the Survey Tool)

Specifically, the Committee's charge included: 1) testing the information supplied by the Library Staff Building Committee regarding information patterns of users; and 2) strengthening library staffs' relationships with their users.

Some of the parameters to guide the Committee's work were outlined in the short-term issues and recommendations outlined in the Library of the Future Committee Report. That Committee suggested that "there should be an ongoing process for facilitating faculty and Student input to the libraries and keeping the campus apprised of the libraries' response."

To prepare for the survey a series of planning and training documents were created and reviewed to familiarize committee members with methods of data collection and analysis,

[28]Chaired by Queen Hampton, the group was comprised of all the reference and collection management librarians.

tips on how to design a questionnaire, and interviewing techniques. The committee began its work with brainstorming sessions to conceptualize the project, to develop a questionnaire, and to establish goals. After much deliberation, it was decided to design a questionnaire with open ended questions to probe into the information gathering patterns and behaviors of the campus community and to track current services. Equal emphasis was placed on the process as well as the content of the project.

The results of the analysis of the interviews showed that campus users did indeed have very different information gathering and use patterns and that these patterns (described in Taylor's terminology) did differ along the lines of both discipline and scholarly level, i.e. the types of information required by those studying in the humanities were markedly different than those required by engineers. In turn, while the nature of the material was consistent, there were differences even within a discipline among the levels in a user group, i.e. what a humanities faculty member needed was significantly different than a freshmen in the same area. There were even noticeable differences between subject areas in the same discipline such as the visual arts as compared to the literary arts.

The differences were not just present in the types of information required, but also in how the information was gathered and used. This meant that what each group valued and required differed widely. Often what the library considered important was not what the user considered important. Findings related to major user groups, especially faculty user groups, were taken back to those groups for discussion and confirmation.

The final report of User Survey Committee is available as supporting documentation.

**User Survey Questionnaire**

SECTION 1: RESEARCH/STUDY ENVIRONMENT

These questions will explore how you obtain information as well as help to determine the changing nature of research. We would like to use this information to see what impact it has upon your use of the library.

1. How do you obtain information?

   for class assignments?

   for research papers?

   for use in teaching?

   to maintain current awareness?

2. How can the library assist you in the retrieval of information?

3. What kinds of research tools (resources) are most important to you in your work now?

4. How do you anticipate technology changing your research or study needs over the next 5-10 years? What should the library do to prepare for the change

SECTION 2: CURRENT SERVICES/FUTURE NEEDS

These questions will explore what library services you use as well as what materials, equipment, and technology the library should offer to support your future needs.

5. Do you use the services provided by University Library?

   If yes, which?

   If no, why not?

6. What kind of work space do you prefer when using the library?

7. What impact will a centralized library have on your use of library materials and services?

   What can the library do to increase access?

8. Is there any equipment or technology which you think the library should offer, but does not provide currently?

   What uses would you make of new equipment or technology?

SECTION 3: COMPUTER USE

These questions will explore how accessible and to what degree computers are used in your search for information.

9. Do you own a computer - at home?

   Yes _____

No _____

If yes, what kind?

Do you have a modem?

Yes _____

No _____

10. Do you have access to a computer - at work?

Yes _____

No _____

If yes, what kind?

Is it connected to a faceplate?

Yes _____

No _____

11. Do you use a computer to retrieve or share information?
If yes, what, how?

SECTION 4: GENERAL COMMENTS

Are there any additional suggestions or comments you would like to make?

**Virtual Library**
(See also Prototyping the GSVL section)
At CWRU we are defining the "Virtual Library" as the concept of remote access to the contents and services of libraries and other information resources, combining an on-site collection of current and heavily used materials in both print and electronic form (and supporting programs), with an electronic network which provides access to, and delivery from, external worldwide library and commercial information and knowledge sources. In essence, the user is provided the "effect" of a library which is a synergy created by bringing together technologically the resources of many, many libraries and information services.

Our "Virtual Library" is not only the "Library Without Walls". We are thinking of collections and the library-staff designed programs which add value to the collections — which exist not only at CWRU, but also in the information and knowledge resources to which we facilitate access. Our CWRU Virtual Library is a "system" intellectually conceived and delivered with the assistance of a variety of computer and intellectual technologies.

The Virtual Library is one of the building blocks of the Knowledge Management Library of the Future.

**Virtual Libraries Grants Submitted**

**Introduction**

During 1991/92, University Library staff began to build upon the early conceptualization of the Virtual Library in the submission of a series of grant proposals. The preparation of the proposals gave us initial working experience in understanding how the Virtual Libraries could actually work and be created.

**Jewish Studies Virtual Library**

This Project creates a Virtual Library for Jewish Studies as a grant proposal to the Department of Education. The thrust of the Project is to use a combination of scanners, workstations, a mainframe computer, software, high-speed telephone lines, and related equipment to create digitized copies (i.e. "imaging") of Roman text, non-Roman text, manuscripts and papers, art work and text as compound documents, sound recordings, and a religious scroll. Faculty members, students, and private scholars will use the high-speed network to share the images through equipment available at each library.

As a result, the person sitting at the Public Presentation Workstation in any of the participating libraries will be able to view the image (the digitized copy) of the original, regardless of the format of the original, making it unnecessary to visit the owning library to view the original in general.

**Art Virtual Library (with Cleveland Museum of Art)**

Our goal with this NEH Challenge Grant Proposal is to bring together faculty members and librarians in the humanities with the powerful technologies available to us to create a new model of the Library of the Future. The strategic importance of the proposal's objective is manifold. First, in order for today's library to be transformed into the Library of the Future we need to create a "model" which combines technologies, physical resources, and people in order to solve both old and new problems in providing the intellectual resources for teaching and research which are possible when the ownership of collections is combined with access to off-campus information and knowledge resources, which is in turn combined with our own ability to create and transmit digitized images of non-textual scholarly materials.

The most important result of the NEH Challenge Grant will be the manner in which it will bring together faculty members, graduate students, librarians, and programmers in the creation of the intellectual and technological model of the Library of the Future—and in the implementation of that model department by department in the humanities.

The second strategic impact of the NEH Challenge Grant will the manner in which it responds to the current CWRU investment in the creation of the Electronic Learning Environment and the commitment in the Plan for CWRU to enhance the humanities through the commitment of resources in priority areas

# THE SOCIETAL ENVIRONMENT OF SCHOLARLY COMMUNICATION

**Introduction**

Our goal in conceptualizing the Electronic Learning Environment is not simply to provide space and links to the fiber optic network in an esthetically attractive environment. Rather, in the Electronic Learning Environment we are physically capturing how we will be thinking differently, researching differently, teaching differently, learning differently, and communicating differently. We are saying that we want this Environment to support the ability to visualize relationships in new ways, to compare and contrast, to re-arrange and restructure, to analyze and integrate, and to negotiate issues crucial to the conduct of social life. We want not only to construct a campus through which people move easily, but also we need to construct an environment in which people communicate differently.

We have to completely rethink what we are about in creating the Virtual Library as a component of Knowledge Management and Scholarly Communication. We have to understand the technological potentials, but the real challenges are in dealing with the person and the group in their relation to information, knowledge, problem-solving, and societal actions.

In doing so we can draw upon the past and our roots, and we must look at the present as we consider the future. What Beniger, Taylor, Shera, and Cleveland are telling us in the following sections, we believe, is that the library is a social and an intellectual phenomenon which in the past has happened to occur in a place. Technology changes the role of the place, but not of the social and intellectual phenomenon. If we key on the phenomenon we will have the foundation for understanding how to deal with nature of the transformation from the Classical to the Knowledge Management Library, as well as with the changing patterns of Scholarly Communication.

As we review the history of libraries and librarianship, for example, what appears is an unfolding drama of intellect and form and tools as librarians, libraries, and users came together during the last 5,000 years. The history of libraries and librarianship is readily available and we do not need to speak to that general history here. What is both engrossing and challenging, however, is the nature of the intellectual processes and tools which librarians developed for the selection of the contents of the library, for the organization of those graphic records in order that the relevant material could be matched to the users needs, and for the human assistance which could translate the need to the relevant graphic record(s).

Librarians have developed libraries into a sophisticated form of information control mechanism in bringing people and knowledge together. Beniger proposes a model for the analysis of social structure and process. The application of this model to librarianship provides us with a rich framework for analyzing and understanding the complex interplay of form, function, tool, and intellect which are brought together by librarians in the creation of the "library construct" (a neologism created to attempt to capture the idea of the library as a social phenomenon rather than a place.

The use of the Control Revolution Model and the other constructs in following sections by librarians permits us to encompass process, form, and technology as they interact with other elements of the Library Construct, but to keep the focus on the result (which is also our mission): "to enable the interaction between knowledge and social activity."

As an integral element of social structure and process, the librarian and the library the librarian creates are equally affected by the interplay of technological innovation, the need for control, the resulting improved control technology, and the iterative momentum which this process continues.

> "That each new technological innovation extends the process that sustains human social life, thereby increasing the need for control and for improved control technology. Thus technology appears autonomously to beget technology and innovation in matter and energy processing creates the need for further innovation in information processing and communication. Because technological innovation is increasingly a collective, cumulative effort whose results must be taught and diffused, it also generates an increased need for technologies of information storage and retrieval."[29] (Beniger, 1986, 434)

Since the late 1800's the intellectual environment in which librarians developed libraries has comprised active intellectual and technological innovations which increased the need for control and for improved control technology. Librarians created new tools, policies and programs to improve control. We have been exceedingly challenged by the technological advances and intellectual developments which came together rapidly in the 1940's:

> "As society evolved, so did formal mechanisms for information preservation and transmittal. Libraries, educational systems, societies of scholars and professionals all date back into antiquity, and all had the primary objective of protecting and transmitting the information and knowledge from generation to generation. All of these mechanisms had a common approach: to gather information and store it in a warm and dry place until someone expressed a desire for a particular record, at which time the record of interest was retrieved. Is a simple but powerful idea.
>
> For century upon century the traditional library as we now it carried out this idea without serious difficulty, but in the 1940s we entered an age of information proliferation, or as some now say, information pollution, which put a critical strain on the traditional mechanisms. We developed into a society of specialists with everybody taking a little tidbit of knowledge, becoming an expert, and as a result demand an in depth analysis of the information recorded. General points to information stores were no longer sufficient. We were not satisfied to have millions of documents; we needed rapid, effective analysis of the information contents of those documents. We became impatient with traditional library techniques.
>
> "Paralleling this shift in information needs was a technological change. We developed microform technology, data communication devices, television, computing machines, and reproduction devices. The documentation movement spread to this country from Europe, and here it attempted to wed the new information technology with our traditional library approaches. Being a people susceptible to gadgetry, we lived for a while with an innocent dream, believing that all we needed was a readable microform device and larger, faster computers.
>
> "Now we have very large and unbelievably fast computing machines, but we still have problems in information handling. In many instances it was found that

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[29]Beniger, op. cit. p. 434.

> computers simply allowed us to make the same old mistakes at an incredible speed. Why? Because there are deep intellectual complexities involved which we are only beginning to understand and appreciate -- problems concerning users and their individual needs, the realization that relevance of a particular document is that the judgment of a single individual, not a universal constant. It is no longer acceptable to build systems geared to a mythical 'average' user who has never existed and never will. there are problems concerning indexing, classification, and searching techniques. How do scientists look for information? How do non-scientists search? Slowly we are realizing that an information system is concerned with more than just documents and their contents -- very much involved is human behavior." [30]

In the following sections we make more specific possible roles and responsibilities. We believe, particularly, that the use of Taylor's User-Driven Model enables us to encompass and support the practice of scholarship in ways we have never been able to do before.

**Librarianship**

> What is it that librarians do that no one else does? I am convinced that the role of the librarian in society ... is to maximize the utilisation of graphic records for the benefit of society. In other words, his function is to serve as the mediator between man and graphic records; not only books, but sound recordings, pictures, audio tapes, charts, whatever contributes to the advance of human knowledge.... The object of the library is to bring together human beings and recorded knowledge in as fruitful a relationship as it is humanly possible to be." [31]

Much of the recent professional discussion of the Virtual Library has focused on understanding the technologies. Just as one cannot establish a railroad without railroad tracks, we cannot implement the Virtual Library without high-speed telephonic communications systems. Ultimately, however, our focus has to look up from the technologies to the scholars, students, and citizens who will be "effected" by the technologies we are trying to bring together. The heart of the library, the pulsing purpose which has comprised the library's mission, has been something else than technology altogether.

The powerful technologies available to us today enable us to explore a host of alternatives for supporting the utilisation of graphic records for the benefit of society. We begin by revisiting the substance of librarianship — what it takes to "bring together human beings and recorded knowledge in as fruitful a relationship as it is humanly possible to be." We suggest a model based on Beniger's work which we believe provides a robust intellectual and societal perspective.

**James Beniger: The Virtual Library: Metaphor for a Control Revolution**

We begin by establishing a perspective for our view of the Information Society and the Virtual Library. Our proposition is that the Virtual Library is a library metaphor for a societal control revolution. The framework for understanding the societal revolution in which we are now participating comes from James Beniger.

> "One tragedy of the human condition is that each of us lives and dies with little hint of even the most profound transformations of our society and our

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[30]Donald B. Cleveland and Ana D. Cleveland, Introduction to Indexing & Abstracting, 2d ed. (Englewood, Colo., Libraries Unlimited, Inc., 1990), p. 11.

[31]J. Shera, op. cit., p. 30.

species that play themselves out in some small part through our own existence."[32]

Beniger traces the origin of the Information society to major economic and business crises of the past century. In the United States, for example, applications of steam power in the early 1800's brought a dramatic rise in the speed, volume, and complexity of industrial processes, making them difficult to control. Scores of problems arose: fatal train wrecks, misplacement of freight cars for months at a time, loss of shipments, inability to maintain high rates of inventory turnover. Inevitably the Industrial Revolution, with its ballooning use of energy to drive material processes, required a corresponding growth in the exploitation of information: The Control Revolution.

Between the 1840's and the 1920's came most of the important information-processing and communication technologies still in use today: telegraphy, modern bureaucracy, rotary power printing, the postage stamp, paper money, typewriter, telephone, punch-card processing, motion pictures, radio, and television. Beniger shows that more recent developments in microprocessors, computers, and telecommunications are only a smooth continuation of this Control Revolution. Beniger states:

> "The Information Society has not resulted from recent changes, as we have seen, but rather from increases in the speed of material processing and of flows through the material economy that began more than a century ago. Similarly, micro processing and computing technology, contrary to currently fashionable opinion, do not represent a new force only recently unleashed on an unprepared society but merely the most recent installment in the continuing development of the control revolution. This explains why so many of the components of computer control have been anticipated, both by visionaries like Charles Babbage and by practical innovators like Daniel McCallum, since the first signs of a control crisis in the early sixteenth century." [33]

We believe there are stunning implications of Beniger's work for our understanding of libraries, technology, and the challenge of the control revolution facing us as we consider the Virtual Library and Knowledge Management. Beniger can broaden our perspective as he views information control and its cyclical interaction with technological innovation as a social analysis mechanism. That is to say, there is a powerful social context for considering the manner in which we will create and use the Virtual Library.

**Robert Taylor: The User-Driven Model**

Robert Taylor provides a model for understanding the essential difference between the way we have had to provide the physical library and the way in which we can provide the Virtual Library. [34]

The user-driven model is one of the foundations of an important approach to information systems. The model supports the argument that major input to the design of information systems must come from an analysis of the information use environment. that environment essentially (a) establishes the conditions of information flows into, within, and out of any particular entity; and (b) determines the criteria by which the value of information messages will be judged.

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[32]J. Beniger, op. cit., p. 1.

[33]J. Beniger, op. cit., p. 435.

[34]R. Taylor, op. cit.

The user-driven model is a complement to Taylor's other two models — the content-driven and technology-driven models — which are presently the major inputs to systems thinking and design.

The content-driven model stems from the traditional divisions of knowledge, a concern with the classification of knowledge and information that has been the focus of scholarly and scientific attention for over 2,500 years.

The technologies of the technology-driven model have essentially prescribed the size, shape, function, dynamics, and even the content of information systems. Most people think of these technologies only in terms of the computer and associated technologies. Historically, the book and, before it, the papyrus roll, the clay tablet, and other forms of knowledge storage were also technologies which affected what our knowledge systems would store and how that stored knowledge could be accessed.

It is not that these content-driven and technology-driven models are poor. It is rather that they are no longer enough in our information-rich world. They need to be tempered and informed by a frame of reference that begins to get at the uses and utility of information and ultimately to fundamental concerns of the value of information.

**Jesse Shera: Communication & Knowledge**

**Introduction**

Another pivotal assumption in the model of Scholarly Communication which we are constructing at CWRU is found in the writing of Jesse Shera. He notes that "the librarian must see his role in the communication process as being more than a link in a chain. He must also concern him with the knowledge he communicates and the importance of that knowledge both to the individual and to society."[35] Shera goes on to consider the relationship of information to knowledge and then to knowing.

> "...the real basic problem in librarianship is to match two patterns -- the pattern of human thought to the pattern of organisation of the library. If we know... what happens to a human mind when it confronts a library store, then the problem of library organisation and retrieval would be solved. Basically the problems of organisation and of classification are the matching of two patterns -- the pattern of organisation of the material itself and the pattern of thought which the user brings to the library collection, and the degree to which these two patterns coincide will determine the effectiveness of the way in which the material is organised."
>
> "Now, a second problem... is the relationship of the human mind to human behavior. what is the aim or objective of communication? I submit that the end of communication... is comprehension."
>
> "I am thinking about modes of conduct from a social point of view, modes of conduct which influence the individual and are communicated through society. In short, I am talking about learning, which is both an individual and a social process. What do we mean by learning? We hand out books to the reader on the assumption that he is going to benefit from the reading of these books and yet this mysterious relationship between brain, eye, and

[35] J Shera, op. cit., p. 38-42.

printed word and its role in the learning process is still a very great mystery. [36]

"Yet the study of the nature of knowledge and the relationship between the structure of knowledge as it has developed in contemporary western civilization and the librarian's tools for facilitating intellectual access to that knowledge have received almost no attention and certainly, no real exploration. Yet here is a study so fundamental to the work of the librarian that there must be developed, in my opinion, a new discipline which is directed towards an improved understanding of the role of knowledge in society. The librarian must evolve for himself a comprehension of the role of knowledge in influencing society and the ways in which society influences the growth of knowledge.[37]

**Communication**
Shera goes on:

"What I want to emphasize here is that any mechanism of this sort, any medium of communication, will have some impact on the content of the message and the library as a medium of communication is going to have its impact upon the communication of knowledge too. It is our objective, our role in society, our dedicated purpose, to make this communication as complete as possible and employ all techniques that seem to have any premise at all to the achievement of that end.

"The librarian must see his role in the communication process as being more than a link in a chain. He must also concern himself with the knowledge he communicates and the importance of that knowledge both to the individual and to society.... The librarian must evolve for himself a comprehension of the role of knowledge in influencing society and the ways in which society influences the growth of knowledge.[38]

And what is knowledge?

**Knowledge**
Shera states further:

"Clearly, if the librarian is to become an effective mediator between man and his graphic records, librarianship must be more than a bundle of tricks, taught in a trade school, for finding a particular book on a particular shelf, for a particular patron, with a particular need.

Such techniques have a place in the skills of the librarian. I think no one can question the importance of a mastery of skills, and technology and theory must develop harmoniously. But the librarian will do his job badly if he does not possess a true mastery over the means of access to recorded knowledge. This mastery implies not only a thorough understanding of the nature of that knowledge with which he is dealing, but also an appreciation of the role of knowledge in that part of society in which he

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[36] J. Shera, op. cit., p.38-42.
[37] J. Shera, op. cit., p. 87.
[38] J. Shera, op. cit., p. 88

operates. If the librarian's bibliographic and information systems are to be structured to conform as closely as possible to man's uses of recorded knowledge, the theoretical foundations of the library profession must eventually provide answers to such questions as the problem of cognition, how man knows..." [39]

"I think there is a very important difference between information and knowledge. Information, of course, both in the sense in which it is used by the biologist and in the sense in which we as librarians use it, is "fact". It is stimulus, really. It is the stimulus which we perceive through our senses. this information may be a single isolated fact or it may be a whole cluster of facts; but is still is a unit; it is a unit of thought. It can have any dimension. but it is that intellectual entity which we receive, the building block of knowledge.

"Knowledge is the consequence of a filtering process; the process of filtering these facts through the ethical system or the intellectual system, or the system of scholarship, if you want to call it that, of the individual who receives it..."

"Knowledge, as distinct from information is the sum total of what is known, the whole body of truth, fact, information, principles, belief, or other objects of cognition, acquired by mankind... It does not really become knowledge until you have in effect processed it through your own value system, related it to your own image and perhaps changed your image of the world, as a consequence of it. thus, in one way or another, large or small, significantly or inconsequentially your awareness or understanding of your world has been altered."[40]

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[39] J. Shera, op. cit., p. 88-89.
[40] J. Shera, op. cit., p. 96-97.

# KELVIN SMITH LIBRARY
# THE ELECTRONIC LEARNING ENVIRONMENT
# TRANSFORMING ACCESS TO KNOWLEDGE

**A Program Statement**

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## SPACE: YESTERDAY AND TOMORROW

Since the World War II, no library has ever been built which has been big enough over its life. In the past, research libraries were typically designed with the book stacks in the center of the building. As the collections inevitably grew, more stacks would be added and seating removed to accommodate the added shelving. Even today, research libraries are being designed in this manner. In the last twenty years this remained the primary priority of research library design. It has been increasing complemented by the addition of increased power, cabling, and telecommunications capabilities for the support of information technologies. The primary assumption, however, was that the collection in the building would continue to expand as publishing continued to double exponentially every ten years.

At CWRU we are committed to programming a library for the future — one which will be compatible with and integral to the Electronic Learning Environment. The same technologies which enable the Electronic Learning Environment have created a new context for designing the library for the future. For example, this is the first time in recent history that we can foresee a crossover between print publishing and digitized publishing in the growth of the two formats. It is the first time in the history of civilization that all forms of recorded communication can appear in one format–digitization. It is also the first decade in which modes of teaching and learning can engage all of the senses through the capabilities of a microcomputer and sophisticated software. Finally, CWRUnet provides the person-to-person connections which enable the creation of a continuum of learning environments.

The choices which we make in programming and designing the Smith Library are truly being made in a context hitherto impossible to others. The demands upon the building are many. Adding space beyond the available budget is not a workable answer and, indeed, we do not require the alternative of a bigger and bigger library to produce a new building which is aesthetically beautiful and functionally powerful. We will succeed with the Smith Library as we understand our current needs, as we understand the capabilities available to us, as we understand the possibilities of the future, and as we take advantage of every opportunity to optimize the spaces and their layout.

## TRANSITIONS

Our library, like most research libraries of the twentieth century, has been characterized by walls. We have had walls separating library functions. We have had walls separating library departments. We have had walls separating the majority of the library staff from the faculty and staff who come to the library. Our working collections have absorbed most of the space in our libraries. The collections which could not be housed in Sears or Freiberger have been placed in off-site shelving facility with its own physical walls and the logical barriers of time and space.

In review of our University Library programs and processes, despite all of our present best efforts to tailor our efforts to meet the needs of a variety of faculty members and student groups, we can see now that the vast majority of our efforts have served only to explain how to use a "walled" library. This is a vital need which must be met, but if we can be successful at identifying and implementing alternative approaches to what is now an extensive commitment of staff and intellectual resources, we can move beyond a labor intensive activity to something of more vital meaning to faculty and students.

The Enhanced Models of Service which are explicated in the Appendix present new and powerful alternatives for the investment of University Library staff and other budget resources. A crucial canon of the Enhanced Models of Service is that *walls dissolve;* so that, even as we talk about

major space components for collections, users, and staff, the transitions between these major components need to be easy and transparent—physically, visually, and intellectually.

> *"So far, our concept of space has been associated with the box. It turns out, however, that the storage possibilities that make up the box-space are independent of thickness of the walls of the box. Cannot this thickness be reduced to zero, with the 'space' being lost as a result? The naturalness of such a limiting process is obvious, and now there remains for our thought the space without the box, a self-evident thing, and yet it appears to be so unreal if we forget the origin of this concept." —Albert Einstein*

Internally, the Smith Library is a box—nothing more and nothing less. We want it to be a beautiful box, classical in the sense that it captures the value of thinking and of humanity. But in its interior, in the arrangement of functions vertically and horizontally, the box should disappear. Only when the box disappears internally, is the power of the library of the future released.

## HORIZONTAL AND VERTICAL RELATIONSHIPS... THE BUILDING AS METAPHOR

If the building is viewed as a metaphor, the first floor is focussed on Information Navigation, the second floor is focussed on Knowledge Management, and the third floor is focussed on the Creation of New Knowledge. Each floor combines compact shelving for the owned collection, user spaces generously interspersed with multipurpose workstations and the equipment required to translate all formats into the common communication format of digitization, and spaces for University Library staff to come together actively with faculty and students in information seeking, knowledge management, and problem solving.

In our programming and established adjacencies, the first floor is the *index* to the universe of information and knowledge, the second floor is the *table of contents*, and the third floor is the *contents of the book.*

Horizontal movement is particularly important on the first and second floors between collections (owned and accessed), finding tools (computerized and printed), digitizing equipment, and people (staff, students, and faculty). Vertical movement is equally important among all three floors, since the creation of new knowledge and learning requires the intellectual and physical communications which occur on floors 1 and 2.

The programming of enclosed spaces is completed primarily to facilitate different types of communications, but not to inhibit communications among the activities which occur within the enclosed spaces. The programming of flexible multipurpose open spaces has the same purpose. Thus, the design envelope becomes the interior walls of the library, with each space contributing to the communications totality of the whole.

## THE CLASSICAL LIBRARY

The classical library models the intellectual process entirely in the context of the onsite, physically owned collection. The most important issue in the floorplan of a classical library is where the spaces are located in relation to the physical collection — how the physical collection is made accessible and how it is made adjacent to thinking spaces. That collection is almost exclusively in the form of printed, textual material in bound volumes. In other words, the vital components of the classical library are: the existence of a physical container of knowledge, the ownership of that

container, the housing of the container, and the ordering of that housing in some structure that allows its retrieval by those privy to the structural scheme.

The boundaries presented by all of those elements become the boundaries to learning. If a user cannot access the physical volume, the treasures of that volume lay forever beyond reach–consequently, the critical relationship of the physical collection in the classical library to all things concerning that library. In the classical library, the librarian is essentially invisible to the user, his or her work having been largely completed when the placement or classification of the physical volume was completed.

In the classical library, the user synthesizes text mentally (by thinking about the text) and physically (by copying the image of the text or otherwise reproducing it). The most common images of a user interacting with the classical collection are those of a user, retrieving a volume from the stacks and physically copying into a note pad or photocopying the contents of the volume. However it is done, the contents of the volume must be reformatted if anything further is to be done with it.

The classical library guarantees access to the physical container of knowledge by means of ownership, but it also offers the many limitations of those containers and their housing and cannot offer any means of integrating that knowledge, cannot facilitate in any way the examination of that knowledge in relation to, in comparison or contrast to, any other piece of knowledge. Intense focus, in terms of collections and services, is offered in place of the integration of knowledge, which is not possible in a classical library–the tools simply do not allow it.

Thus, discreteness is a hallmark of the classical library. Discrete physical volumes in discrete classification schemes housed in discrete areas, all examined by the user as discrete items, until the user's intellect is brought to bear on the problem and provides some synthesis of the various elements, a task that the classical library and the tools of the classical library cannot facilitate.

## THE SMITH LIBRARY...THE VIRTUAL LIBRARY

The library we will build, the Kelvin Smith Library, the library of the future, models the intellectual process as an active, onsite experience, where technologically-driven tools allow the users to reach out for knowledge, wherever it may be, whatever form it may be in, and to gather that knowledge with tools that will record it and allow it to be manipulated, compared and contrasted to other related knowledge and thus, to facilitate synthesis.

The most important element of the floorplan is how users are brought into proximity with the world of knowledge and how the space facilitates the interaction between library staff and the user. For quite some time into the future, it will be important to allow easy and convenient access to a working collection, but that working collection will include a range of material formats, some located onsite and housed in traditional compact shelving, but many of the resources in the working collection will also be in a digitized format, available all across the network infrastructure.

The vital components of the library of the future will be: intellectual access to information and knowledge resources in all formats, a networking infrastructure to act as transmission highway, workstations that feature hardware and software to facilitate online access and manipulation of the gathered knowledge, library staff skilled in the tools of knowledge management, interface design, and user education, adequate and varied training facilities for both users and staff, a variety of flexible user spaces that can evolve along with the transformation process, and a vigorous and viable working collection that supports teaching and research.

The boundaries presented by these elements are formed only by our understanding of the concepts and the evolution of the transforming tools. A user can choose from physically accessible, onsite materials, but the user is not limited or bounded by physical location of material or its format, in fact, wherever the user can access the tools of online access and the expertise of knowledge management, the user can access the resources of the library of the future.

The staff of the library of the future are highly visible, active collaborators in the process of knowledge management, and much of their work is constantly evident to the users in the form of interfaces designed to overlay digital resources. These digitized resources are organized by thought processes and the tools the user employs to manipulate them will think with the user, modeling and simulating, engaging all the user's senses as part of the process of synthesizing knowledge.

The new knowledge that emerges will already be in a format that can be managed and transported. Thus as the classical library offered physical access, the library of the future complements physical access with intellectual access and the ability to facilitate knowledge synthesis. Instead of a hallmark of discreteness, the library of the future offers integration as its enduring theme– integration of formats, integration of knowledge, integration of user spaces, integration of library staff.

We are equating the Smith Library with the Virtual Library. The Virtual Library is defined as the act of remote access to the contents and services of libraries and other information resources, combining an onsite collection of current and heavily used materials in print, microformats, and electronic form, with an electronic network which provides access to, and delivery from, external library and commercial information and knowledge sources worldwide. In essence, the faculty member and student are provided the "effect" of a library which is a synergy created by bringing together technologically the resources of many libraries, information services, and knowledge stores. In the library profession this type of library is currently labeled the "virtual library."

To maintain its flexibility and consequently its vitality to future generations, the Kelvin Smith Library will differentiate spaces by what the spaces offer and what activities primarily occur there, but underlying every kind of space will be the notion that the primary concern is that of the user's relationship with the world of knowledge. To facilitate that relationship, one must be able to move easily between formats, between information and knowledge, between individual and group thinking, between floors, so that the entire building is taken as a whole.

We have a particular challenge and opportunity in programming the Smith Library to respond to an intellectual environment which is in the process of transformation, and in its role as a virtual library. We have, therefore, given very careful consideration to the balancing of major space assignments in the Smith Library Program.

## EMERGING SOCIAL AND INTELLECTUAL COMMONS

Our challenge in framing the Kelvin Smith Library through its Program Statement is that we are describing a library which has never before been constructed. "The early history of electric media is less the evolution of technical efficiencies in communication than a series of arenas for negotiating issues crucial to the conduct of social life; among them, who is inside and outside, who may speak, who may not, and who has authority and may be believed....New practices do not so

much flow directly from technologies that inspire them as they are improvised out of old practices that no longer work in new settings."[1]

Certainly we at CWRU are inhabitants of a technology-rich community. We are living with all of the possibilities of the Electronic Learning Environment which we are creating on this campus. We are also living with all of the problems which are part and parcel of building a new world. It is easy enough to conclude that our solutions to the problems of using our new and powerful technologies must be technical solutions. If that was the sole problem facing us today in framing the Smith Library, the answer would be to focus on technology; however, the heart of the library, the pulsing purpose which has comprised the library's mission, has been and continues to be something else altogether.

What is it that librarians and the libraries they create do that no one else does? "I am convinced that the role of the librarian in society...is to maximize the utilization of graphic records for the benefit of society. In other words, his function is to serve as the mediator between man and graphic records; not only books, but sound recordings, pictures, audiotapes, charts, whatever contributes to the advance of human knowledge....The object of the library is to bring together human beings and recorded knowledge in as fruitful a relationship as it is humanly possible to be." (Shera, 1970, 30)

Our goal in conceptualizing the Smith Library is not simply to provide space for books and links to the fiber optic network in an esthetically attractive environment. Rather, in the new building we are physically capturing how we will be thinking differently, researching differently, teaching differently, learning differently, and communicating differently. We are saying that we want this building to support the ability to visualize relationships in new ways, to compare and contrast, to re-arrange and restructure, to analyze and integrate, and to negotiate issues crucial to the conduct of social life. We want not only to construct a building through which people move easily, but also we need to construct a building in which people communicate differently.

We are conscious of the fact that in the new building we are not substituting new patterns for old. Even if we wanted to, it is much too early in the transformation process to force such a judgment. Rather, the new library is a symbolic and practical building which provides a bridge to the past and a gateway to the future. So, in programming the building we must focus on patterns and relationships which, themselves, are in flux.

Our mission in programming the Smith Library is, therefore, manifold. It includes the ability to:

- Foster graceful transitions
- Foster changing patterns and relationships
- Foster the ability to interact socially with intellectual ideas
- Foster the potential for quiet, individual reflection
- Foster the opportunity to combine owned collections with evolving formats for the use of information and knowledge in the creation of new knowledge
- Foster collaboration

Our goals in programming the Smith Library are manifold as well:

- The building is programmed, designed, and constructed in the context of the CWRU Electronic Learning Environment.
- The building must be as flexible as possible and in support of this goal, the major spaces will be differentiated as to use over the life of the building.
- The building will support changing patterns of scholarly communication and publishing.

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[1] Marvin, Carolyn, When Old Technologies Were New, p. 4-5.

- The building will support new patterns of thinking and interacting with information and knowledge.
- The building will provide a variety of seating options for faculty and students, with student seating being a top priority.
- The building will house the working collections which are regularly used in support of teaching, learning, and research.
- The building will support CWRUnet access as a top priority.
- The Smith Library is a bridge to the past and a gateway to the future, combining present models of service with enhanced models of service.
- The building will house *all* University Library staff in support of their service to and collaboration with faculty and students.
- The building will support instruction in the use of library-oriented information.
- The building will be intensely human. Our goal is to draw people to the library.
- The Smith Library will serve the campus as an intellectual commons.

## PROGRAMMING PREMISES

First, we are building on the foundational assumptions and directions recommended by the Library of the Future Committee. Second, the University Library staff, the members of the Building Committee, and the members of the Faculty Senate Library Committee have spent the past year in intensive analysis of the library programs, of the technological environment, of the faculty and student information environments, and of those areas which are part of the design and construction of a new facility. Throughout the year we have established a number of premises for the programming of the Smith Library. They include the following:

1. Our present University Library models of service are labor intensive and focus on the elementary but necessary aspects of introducing the library to its users. The Library Staff will design the information system to provide the majority of the introduction to the library. Spatial access to information system workstations and to staff in immediately available service points will be balanced.

2. Our present University Library models of service separate physically many of the decision and service points where faculty and students interact with library staff and services. We will combine the majority of the decision and service points where logical and feasible.

3. University Library staff have used the results of the User Survey to develop enhanced models of service. The enhanced models of service focus more staff time on working in-depth with faculty members and students, as well as on the development of new information tools. The staff will reorganize in support of these goals. We will combine the staff into one area to facilitate communication and the development of the new models and to provide spaces for faculty and students to have in-depth, effective communications.

4. Coherent access to information and knowledge is integral to the Smith Library as the library of the future. We will utilize compact shelving to maximize the proportion of the owned collection which will be housed in the building. We will utilize a sophisticated floor system to ensure the most flexible user, staff, and workstation access to CWRUnet and electrical power.

5. Enclosed spaces are less flexible than open spaces over the life of any building. We will program enclosed spaces only where necessary and where future use of the enclosed space is interchangeable with the present use of the space.

6. Providing for a variety of seating experiences in large open spaces will be accomplished by focusing on lighting systems which permit sections of the large space to be lighted differently over time in response to changing user seating goals. Choice of furniture, dividers, static shelving, etc. will complement a flexible lighting scheme.

## SPATIAL FLEXIBILITY AND DIFFERENTIATION

If there is anything we know today about higher education and technology, it is that the pace and scope of change is unprecedented. At every hand, we can see that patterns in creating new knowledge and disseminating it broadly will continue to change as informational and educational technologies become part of the faculty member's and student's academic lifestyle. As we mentioned previously, our mission in programming the Smith Library includes the ability to foster graceful transitions. Therefore the building must be *flexible* in supporting new groupings of people, information technologies, and digitized information which complement the owned collections.

We believe that we can ensure the flexibility of the building through the segregation of six basic types of program settings. The resulting plan of "differentiated spaces" permits us to maximize the use and control the cost of each of the spatial components. Thus, we can maximize the efficiency of the entire building structure. This concept of differentiated spaces, which optimizes the accommodation for each program setting type (matched by cost control related to that setting), is possible because library operations will be managed to eliminate the requirement for one program setting to displace another.

### Compact Book Stacks

The vast majority of the working collections to be housed in the building will be shelved on compact stacks, including books, bound journals, microformats, and maps. Included, as well, will be the Reference collection, the Special Collections collection, and Government Documents. The compact shelving layout will be designed to facilitate browsing, as well as to maximize the capacity of the shelves.

### Static Standard Shelving

Selected and limited portions of the collections such as current periodicals, new books and the reserve collection will be housed in static, standard shelving located in the user and staff spaces. The selective use of static shelving in general staff and user spaces permits us to respond flexibly to changing user patterns.

### Multi-Use Flexible Space

These are large open floor(s) with a variety of furniture and equipment settings for users and staff. The lighting system will be designed so illumination levels may be adjusted to suit changing program settings. The lighting system will most probably be accommodated within the ceiling and not in the furniture. A raised floor will probably be required for the distribution of power and information cabling to work stations and to all seats and work areas in the "people spaces." Activities will be assigned to the multi-use use in a manner which groups noisier activities together, and in a manner which groups quieter activities together.

### Enclosed or Semi-Enclosed Offices, Conference Rooms, Seminar Rooms, and Classrooms for Both Staff and Users

In the layout of these spaces, typical sizes will be assigned which will then accommodate different purposes from time to time. For example, what today is a student seminar room might become tomorrow an enclosed faculty office accommodating two faculty members. Wherever possible and appropriate we will explore the use of open office planning and furniture for university library staff as well as for faculty and student spaces.

**Enclosed Spaces which Require a High Level of Environment Control and/or Security**

Types of activities requiring this space include Special Collections, the Library Education Multimedia Training Room, the Conservation Facility, and the Information Services Public Multimedia Center.

**Representational Space**

A portion of the multi-use flexible space will be designated as representational space for an undergraduate reading area, a graduate reading area, and a science/engineering reading area.

## SPACE PROPORTIONS

There are three primary types of space in the Smith Library: Collections, User, and Staff. The balance among the three is an essential consideration, particularly when combined with the principle of space differentiation. The major space assignments must not only be workable when we move into the library, but over the life of the building as well. Thus, we have taken special care to determine space assignment proportions which will remain valid and responsive through the changing times which will comprise the life of the building.

**Collection Space: Owned 35,912 ASF - 44%**

1. Compact Shelving

   The Library of the Future Committee developed the concept of the core collection to describe owned collections which needed to be Readily available in the new library. University Library staff are well into the process of a close analysis of the mix of working collections for each department within the context of the User Information Environments and trends in the patterns of publishing and scholarly communication. Based upon preliminary findings we have determined that the working collection size can be set at 710,000 volumes to be housed in the compact shelving, which is all of the UL collection less brittle materials and selected government documents (33,522 ASF). The compact shelving will be loaded at 75% of capacity when we move into the new library. This capacity allows for approximately 177,500 volumes of growth approximately 7 years of growth beyond occupancy, at the present rate of print acquisition.

2. Static Shelving

   Static shelving will used judiciously in the user and staff spaces for materials such as current periodicals, new books, and reserve materials which benefit either from more comfortable user space or the need for security (2,390 ASF)

3. Campus Non-Library Shelving (not included in the above)

The University will continue to maintain campus non-library shelving (now called Off-Site Shelving) for the retention of research materials and University Archives materials which are germane to the University's teaching and research programs, but which are not immediately required on a day-by-day basis. UL Librarians have determined that approximately 200,000 volumes will be shelved in the contiguous non-library shelving as we move into the Smith Library. The volumes are limited in scope: brittle collections which will experience further deterioration if left in the Smith Library shelving; and government documents which are not required on a daily basis, but which we retain to fulfill our commitment to the Federal Government Depository Program (approximately 200,000 volumes).

4. Collection Growth

We will design and utilize the compact shelving so that the stacks will be at 75% of capacity when the building is occupied. This capacity will provide us for many years of collection growth. We will move into the Smith Library with approximately 710,000 volumes in the compact shelving at 75% of the shelving capacity. At the same time, the Campus Non-Library Shelving will hold approximately 200,000 volumes. Between the two capabilities and the use of alternative formats to bound volumes, the University Library will be able to house owned and accessed collections over the life of the building.

**User Space: 30,753 ASF - 38%**

The need for user space is driven by 1) the importance of seating a growing student population a percentage of whom may have only limited on-campus access to CWRUnet, for example, commuting students; 2) the need to provide the workstation capability which includes extended Library hours access to leading edge information workstations which support multi-media access to knowledge and information resources; and 3) a greater number of varied seating accommodations for faculty and students in enclosed and open spaces. Once the present Freiberger/Sears "brittle and uncomfortable" user spaces are replaced with a comfortable and esthetically pleasing facility, experience with other new library buildings indicates that student and faculty use of the building will increase markedly.

**Staff Space: 14,335 ASF - 18%**

Our value-added analysis of user patterns and of the knowledge and information environments indicates clearly that we have the capability and the need to restructure the organization and responsibilities of the library staff. For example, all library staff will be involved directly with faculty and students; library staff will reorganize into discipline-focussed teams for more efficient and effective decision-making closest to daily operations (with a concomitant need to respond to interdisciplinary patterns); all library staff will participate in some level of design of the Knowledge and Information Management System; and all library staff will invest more time in solving intellectual and processing problems with faculty members and students. We need all of the staff to be in hourly communication with one another and with faculty and students for our enhanced models of service to work.

## DESIGN GOALS

- The Kelvin Smith Library will be "a symbol of a unified University whose goal is to bring together the modes of learning and selected content of the humanities, the social sciences,

the natural sciences, and engineering in a curriculum that provides both historical and global perspectives, and is oriented to the problems, opportunities, and technologies of the future. Our undergraduate programs should ensure that students develop an understanding of the relationships between this and earlier civilizations, and among Western and other societies—their economies, their political systems, their cultures, and their languages. Building on this foundation, the programs should help students identify and analyze issues that will be important to the future of our society, topics that use what is known to look forward at what must come to be known. These programs also must employ and illuminate emerging technology—such as the ability to store, retrieve, and manipulate vast quantities of information electronically. In preparation for adult lives as leaders, professionals, and citizens, our students will be expected to bring these skills with them when they graduate..." (*Plan for CWRU, 1990*).

- The Smith Library will be a building which physically captures how we will be thinking differently, researching differently, teaching differently, learning differently, and communicating differently within the context of the Electronic Learning Environment. The building will support the ability to visualize relationships in new ways, to compare and contrast, to re-arrange and restructure, to analyze and integrate, and to negotiate issues crucial to the conduct of social life.

- In the Smith Library we want not only to construct a building through which people move easily, but also a building in which people *communicate differently*.

- The University is committed to the design and development of a learning environment that does away with the traditional separation between library and computing services, capitalizes on resources for creating and sharing information, embeds these new resources in the curriculum, and delivers them to students throughout the campus (*Plan for CWRU, 1990*).

- The Electronic Learning Environment will make it possible for CWRU to realize, in dramatic fashion, its academic goal of maximum information-management capability, as well as directly affecting progress toward the other goals.

- High quality design, materials and finish. Dignified and refined in appearance, neither sterile or overly embellished, and able to stand the test of time.

- Open, inviting, and comfortable for students, faculty, and the University community.

- Respectful of University Circle architectural traditions, scale, materials and open spaces. A good neighbor to Severance Hall and the Cleveland Museum of Art.

- Clearly identified as the University Library and evocative of academic excellence.

- Make a significant artistic and architectural statement that symbolizes the reputation and aspirations of Case Western Reserve University.

- A combination of traditional entry spaces, state-of-the-art compact shelving, computer equipment, a variety of faculty and student seating, and staff spaces which facilitate contact with one another and with faculty and students.

- A site plan which balances the public goals of the master plan and the specific goals of the library, creating a new and appropriate "heart of the Case Western Reserve University campus."

- A sense of serenity and expansiveness created by a building logically and clearly organized with circulation well-distributed, appropriately quiet, and filled with light.
- Adaptable, expandable building organization, structure, environmental and communications systems which recognize and allow for changes in library programs.
- Spatial variety both interior and exterior. Clearly expressed entrances should be oriented toward the campus center.

## ENHANCED MODELS OF SERVICE AND SPACE CONSIDERATIONS

Using a library building and using the tools and services housed in such a building cannot be separated. Questions of access to information and ownership of information can no longer be separated. In the context of these two ideas, the development of enhanced service models for University Library contributes significantly to the physical configuration of a new library.

The service models which have been programmed for the Kelvin Smith Library have been designed and will continue to be evaluated and redesigned based on an analysis of the information needs of the CWRU community. This analysis includes systematic and ongoing measurement of the types and natures of information the CWRU community uses and the various ways in which that information is used. With such analysis, it is possible to design the best and most cost-effective services by which librarians can address users' needs in relation to relevant bodies of information.

The results of this methodology indicate that University Library, as an elaborate and complex information system, presently spends intensive resources toward orienting users to itself. The new service models which have been programmed will create an information system which is more self-explanatory, allowing precious limited resources to be diverted to other activities such as analysis and interpretation of information, or interface and tool design. This methodology for analysis and design of service models addresses the Library of the Future Committee's recommendation for ongoing output measures for the Library of the Future.

In an age of explosive expansion of information, rapidly shifting information technologies, and limited resources to address information needs, the service models of the Kelvin Smith Library will be characterized by increased integration of the library's personnel and fiscal resources. The first type of integration which will continue is the vigorous development of the virtual wing of the library, i.e. the continued fusing of the physical library, the electronic learning environment, and the network. This will allow for an expansion of services via various remote components and the maximum utilization of machine technology to free more staff and user time for higher level information activities such as analysis of information or interface design.

The second type of integration which will occur will involve the management of the many types of collections available to the CWRU community: onsite and remotely housed print and non-print collections and various remotely accessed digital sources. Toward a seamless integration of these, the resources of collection management and access services will begin to merge and the tools by which the collections are accessed will move toward a more unified and sophisticated front-end. A new bridge between scholars and librarians—knowledge management–will become an increasingly important component of the research library, allowing collection resources to be focused on self-identified user needs.

The third type of integration which must occur will involve the reorganization of University Library. The traditional rigid departmental boundaries of the library will give way to a more flexible form of resource management in which various types of expertise can be brought to bear on problems in a rapid and flexible manner. Task-orientation will be replaced with problem solving.

The realization of the Kelvin Smith Library as a well integrated information system will be facilitated largely by training–training for the users of this information system as well as for the librarians. Training for librarians will require subject expertise to be augmented by extensive interaction with emerging technologies and active participation in interface and information system design. The goal of training for users will always be maximum empowerment of the user and will recognize the need for redundancy, flexibility and reiterativeness in training users in such a complex and shifting information environment.

**Working Collections**

The working collection is defined as the physical collection owned and housed in the Smith Library as well as digitized collections and online resources and services accessible from library information workstations. The working collection will include bound monographs and journals, microformats, and maps arranged on browsable compact shelving. The compact shelving will facilitate two goals of the building: to create a high volume of flexible user space and to allow for convenient browsing of books and journals. In addition, the working collection will include digitized formats, CD-ROM's or their functional equivalent, databases (bibliographic, statistical, graphic, etc.) and online information sources and services made available through workstations and CWRUnet connections throughout the building.

- Print materials are important resources and will continue to be vital resources far into the future. The Kelvin Smith Library will seek to maintain vital print collections and to make available tools in various formats to make those printed resources even more relevant.

- For the first time, we will be able to combine the transforming capabilities of digitized resources, the technologies to manipulate the digitized materials, the fiber optics network infrastructure for transmitting and receiving the materials, and the value-added processes related to structuring information in response to user needs–all to produce Knowledge Management Systems that will make information relevant on an individual level never before possible.

- The working collection is designed to work with these current and future directions and to co-exist and complement new tools that will allow users to move beyond the limits of knowledge "containers" and to overcome the problems of physical location. At the same time, the working collection should benefit from new access tools that, while extending and broadening intellectual access to materials, will also produce relevant access to onsite collections, making them a more valuable and vital resource to campus users. It remains that the size of the working collection means that a number of collection management and service realities need to be actively acknowledged.

The initial spatial implication of this working collection context is that the user spaces must support faculty and student members who will be combining more information formats than they have been able to do in the past. The "Scenarios" section of this document describes many of the possible patterns, with implications for ready access to both the compact shelving and various workstation configurations, for example.

In addition, everything about the technological context of the Electronic Learning Environment implies support for new patterns of teaching, learning, and scholarship—including changing roles and responsibilities for the library. We have already noted that the Smith Library's mission is the fostering of graceful transitions. How can we do that given what we have learned from the user surveys? Among the many findings are the following:

- Consistent requests for more digitized formats
- Requests for image databases
- Requests for more photocopy machines
- Requests for the ability to browse easily current periodicals
- Requests for scanning equipment
- Requests for color photocopy machines
- Requests for color printers
- Requests for networked access to digitized formats
- Requests for access to high-powered microcomputing equipment
- Requests to download from Euclid Plus into private database packages
- Requests for the University Library to be open longer hours
- Requests for easy-to-use system interfaces
- Requests for librarian assistance of all sorts
- Requests for training

Something new is at work as faculty and students look to their library. Clearly, the Electronic Learning Environment is already taking hold. The implications for the Smith Library programming are, then, manifold. First, and foremost, is the faculty and students desire for more tools at hand as they interact with owned collections—that is the purpose of photocopy machines and scanners, for example. Access to the tools and interactions must be facilitated by the design of the library.

As well, faculty and students are requesting in their new library almost all of the hardware, software, and information/knowledge resources which are integral to the information and educational technologies of the Electronic Learning Environment.

Librarians are the people who create the libraries through which human beings and recorded knowledge are brought together in as fruitful a relationship as it is humanly possible to be. Faculty members and students are telling us that they need the continuing assistance of members of the library staff to satisfy new as well as classical purposes.

**User Space**

The working collection context strongly suggests that any past spatial or intellectual barriers among bound volumes, microformatted collections, digitized collections, workstations, scanners, and so forth are beginning to disappear from the users' perspective. *It is our goal to capture a similar transparency in our programming.* It is no surprise, therefore, that there needs to be a transparence between the working collection space and the user spaces. "Differentiated space planning" does not mean intellectual and communication activities kept separate one from another.

The data from the User Survey interviews and the informed opinion of the librarians was used to create a picture of the information use environments of faculty and students. An information environment is the context from which information arises. As the librarians probed into the information gathering behaviors of scholars and researchers, a set of elements such as access to information, browsing patterns, training and equipment needs, work space requirements, arrangements and classification of material, etc. evolved. A summary of the information environments for faculty and students appears in the Appendix.

Space Implications of Information Needs

To respond to the need for immediate access (physical and electronic) the space implications for related activities such as browsing, researching, photocopying, and media production and viewing are:

- To provide an environment conducive to browsing–wide aisles and comfortable seating with ample work space nearby
- To provide extensive photocopy facilities–particularly near journals
- To provide sufficient number of workstations for access to online catalog, databases, network, etc.
- To provide easy access to materials through clear signage and instructions

Training and Collaboration

Most users view librarians as the best conduit to the university community to explain, educate, promote, and to coordinate the information needs of the campus. The building should be an intensely human place. The success of the library is dependent on how well it is designed to accommodate the dynamic process of communication. The building should respond to:

- The need for staff to interact with each other one-on-one and in small and large groups to problem solve and to create new knowledge
- The need for librarians to interact one-on-one with users for training in the use of print materials, CD-ROM's, online databases, etc.
- The need for librarians to interact with users in small and large groups to provide user education
- The need for library staff to interact with faculty and programmers one-on-one and in small groups in the process of creating new knowledge and designing transparent system interfaces

Just as the building supports a transparency between collections and user spaces, there is to be a transparency among collections, users, and staff. In the development of the Enhanced Models of Service, the UL staff are describing new relationships and transitions.

**Staff Space**

UL staff will be managing mixed collections of owned and access materials. A multipurpose workstation on every staff desk facilitates that management and removes the need for shared machine workspace. UL staff will also be developing specialized databases, etc. as part of the implementation of the KIMS. Thus, UL office space includes sufficient space to meet with faculty and students. As well, the Multimedia Training Laboratory is a crucial "coming together" space.

The constantly shifting information environments require continued close coordination among all of the UL staff, in conjunction particularly with faculty members. Thus, we have programmed all staff located in a single area for offices, with a few backup workstation spaces contiguous to the Shipping Room.

We are differentiating various types of reference service appropriate to the enhanced models of service. These include a mix of reference materials on the first and second floors accompanied by three types of staff/user interaction spaces: Immediate Service, In-Depth Service, and Office Consultation space. As well, we have programmed a variety of enclosed spaces for group meetings with faculty, students, and staff.

The configuration of the building will reflect the basic flow of information and knowledge use and searching patterns. The purposes of the spaces will be flexible in order to change over time. As well, the building configuration will reflect the importance of Interlibrary Loan, well integrated with other public service programs.

## SCENARIOS

### Example of Smith Library Use by a Full-Time Undergraduate with Junior Standing

Joan Everyuser is in her dorm room. Classes are over for the day. It is mid-semester and as usual she has lots to do. She goes to her computer and logs on to the network (CWRUnet) to check her e-mail. Some of her friends from CLASS 101 want to work on a project together this evening. One of them sent out a message saying they would meet at the library at 8:00.

Joan Everyuser decides to continue working on the draft of her paper for CLASS 101. She needs more background info and logs on to a CD-ROM encyclopedia available via the network, does a quick search and reads several articles related to her paper topic. She downloads a bit of text to use as a quote. One particular book is mentioned repeatedly in the articles. She logs on to the library's online catalog and finds that we own several copies, but all are on loan. She requests a book recall online and asks to have the book sent to her dorm rather than picking it up at the library. She may be going by the Shaker Hts. Public Library over the weekend and logs on to their online catalog to see if they have a copy. They do and it is not charged out. She could request the book be held for her using the ClevNet system, but she decides she'll see how her weekend shapes up and prints out the citation in case she goes by Shaker Public. Everyuser's essay assignment includes finding several journal articles, so she logs on to InfoTrac, searches and finds citations for articles but they don't seem very relevant. She remembers that a librarian had come to CLASS 101 and described some online tutorials and aides related to journal index searching. She finds the library's file server on the network and opens a HyperCard stack on basic journal searching. The menu includes a section on InfoTrac. She goes through it and discovers several suggestions for search strategies which may help. She prints several of the screens which seem helpful. She wants to try her search again, as well as try some of the CD-ROM indexes, but decides she would rather tackle that at the library where someone will be around to help. Joan Everyuser goes to dinner.

Everyuser is going to the library. One of the campus shuttles has picked her up at her dorm and drops her off in front of the library. It is still light and the area in front of the library is quite busy with students. She sees some friends and they ask her to go over to Thwing for coffee. They bring it back out into the commons area between the library and Thwing because the weather is nice. They talk and people-watch, sensing the bustle of Euclid Avenue, but feeling pleasantly buffered from the world outside the university. Joan Everyuser finally heads into the library.

Everyuser walks in and immediately sees the Pre-Reference/Circulation Service Desk. Deeper into the first floor she can see an array of computer workstations. Signage nearby reminds her that the journals she'll likely be using are housed in compact shelving nearby on the same floor. She glances at the photocopying area near the Pre-Reference/Circulation Service Desk and notes that it is not too busy yet and she needs to get cracking if she wants to find and photocopy some articles.

She also looks to see how busy the Information Services Public Multimedia Center is because she has some videos she needs to watch for other classes. There are still a few seats open and she decides to do her journal searching next.

Joan Everyuser goes immediately to one of the workstations and starts to use some of the CD-ROM indexes. She is getting citations, but they still do not seem particularly relevant to her paper topic. She goes to the Pre-Reference/Circulation desk and asks for some help. The librarian asks questions about her topic and her previous searching strategy, then suggests which CD-ROM's would be most useful and what search terms are closest to Everyuser's essay topic. After more searching and printing out citations, Joan Everyuser heads straight to the journal stacks and attempts to find the articles. One of the CD-ROM's listed which journals were part of the library's working collection, but several others did not. The aisle she wants to use is closed but no one is in the empty aisle, so she opens the aisle and finds several of the volumes she needs and, while at the shelf, glances to see if they might be useful. She can't find several of the journal titles. She goes to the photocopying area and copies several articles. One article has a useful illustration which she would like to scan and include in her essay. She can do the scanning in the Media Production/Output Room and that's right near where she'll go to view her videos. She forgot to bring a diskette, but the student aide in the Media Production/Output Room helps her scan it and she logs onto her dorm room computer remotely and saves the scan to her own hard drive. She goes back to the Pre-Reference/Circulation desk and asks about the titles she couldn't find. Pre-Reference librarian shows her a print CAMLS Union Serials list for places where the journal titles are located in the city. Joan Everyuser notes that a friend of hers goes to the U. of Akron and the Pre-Reference librarian does a quick OCLC search to confirm which titles U. of Akron owns. If she wants, Access Services can request that one of the local participating institutions fax copies of the articles.

While at the Pre-Reference/Circulation Service Desk, Everyuser asks for the video Professor Y had put on reserve for CLASS 104. She goes to the Information Services Public Multimedia Center nearby and finds a open station. As she starts to view, another student from CLASS 104 taps her on the shoulder and says that since that is the only copy, could they view together? After viewing the video with her classmate and returning it to the Pre-Reference/Circulation Service Desk, Everyuser goes back to the multimedia viewing area and asks the student aide on duty about viewing a networked video for another class. The student aid checks at one of the workstations for a listing on the network of what is playing at what time and tells the student the video she wanted has just started. Joan Everyuser takes it from there and uses the workstation's menu to start viewing the video. She could have done this from her room, but she much prefers the very large screens and she is less distracted when she works in the library. When she is done, she notices that it is nearly eight o'clock and takes the elevator up to the third floor.

When Joan Everyuser steps off the elevator she is reminded how much she likes the third floor, with its many nooks and crannies to study and beautiful views of Wade Oval and the Thwing/Library commons. She notes the stacks at one end and since it isn't quite eight o'clock goes to browse the stacks around the classification number of the book she had looked up earlier but which was charged out. She finds the aisle she needs is closed and both the open aisles have people in them. She asks if she can open them quickly and goes in, finds the classification area she wants and pulls a handful of books to look through. She goes to one of the areas near the stacks to look through them and keeps one which she thinks might be useful. She still has a little time before her group meeting, so she goes to one of the OPAC terminals close by and tries a call number search. She remembers in the "General Introduction to the Library" tutorial which she found on the network, that this type of search is a kind of electronic browsing of the shelves. She notes several recently published books which are charged out. She prints out the citations and will check on her dorm room computer later to see if the Shaker Hts. library has them. It is eight o'clock and she goes to look for her friends.

Joan Everyuser finds that her study group have staked out an area with a large table which is isolated a bit from the rest of the study areas around it. They work as a group on their project until 11:00.

Joan Everyuser goes back to the first floor to charge out the book she had found earlier. She catches a shuttle in front of the library which takes her back to her dorm.

Once in her dorm room, Joan Everyuser wants to check several things before turning in. She opens a graphics program on one of the network software servers and opens the scan she had done at the library, which is now on her hard drive. She cleans it up a bit and pastes it into the draft of her essay to see how it will look. She's pleased enough with the results to decide to try and see if she can find an appropriate map to paste in as well. Everyuser invokes her screensaver program and turns in for the night.

**Example of Smith Library Use by a Faculty Member**

Dr. EveryUser is a social scientist. It is late summer and as usual that means she is trying to finish several articles which are the result of her research from spring and summer. She is also trying to prepare for several classes she will teach this fall. Normally she would work at home but she needs to do several things in her campus office and at the library, so she drives to the university.

Once in her office she checks her e-mail, and among her messages are several related to the special database she has been building in conjunction with the social science librarian and several graduate assistants. One of Dr. EveryUser's research specialities is creativity in young children and a specialized database has been set up and is being maintained to address information needs in the research circle of Dr. EveryUser, faculty with related research interests, and numerous graduate students who work with Dr. EveryUser or who are preparing dissertations under her.

Her first e-mail message has to do with one of several components in this Creativity in Young Children database. The first message is from the social science librarian telling Dr. EveryUser that the results of the monthly current awareness search in PSYClit and several other databases is available on one of CWRU's ftp sites. Dr. EveryUser and the librarian had meet several times at the beginning of the project and designed a basic search strategy for maintaining current awareness in the journal literature. The search strategy is a saved file which the librarian executes once a month. Dr. EveryUser can also execute the file from her office using the networked CD-ROM indexes, but the regular monthly check is done by the librarian who is also responsible for keeping abreast of CD-ROM and online databases and if they or their search engine changes, the librarian modifies the saved search strategy. Dr. EveryUser ftp's the file and looks over the citations/abstracts. She marks a number of articles as irrelevant. All citations will remain in the current awareness component of the database for a while, but eventually as these citations move on to other parts of the database, the irrelevant citations will be dropped. The ftp'ed file has been marked with holdings information and Dr. EveryUser prints out citations for articles she will look at in the library. Dr. EveryUser logons to the library's online catalog and transfers information from the citations for articles the library doesn't own to the online ILL form so that they may be sent to her. She sends the revised file back to the ftp site.

The second e-mail message is also from the social science librarian and describes the latest additions to the full-text section of the Creativity in Young Children database. The university now requires all students to submit dissertations in machine readable form and the university has negotiated with UMI to retain some rights to dissertations in order to use them in local databases. One of Dr. EveryUser's students graduated last spring and his dissertations is now mounted and available in the database. Several of Dr. EveryUser's articles are also now mounted, the university having also negotiated with some journals to retain some rights in regard to faculty publications.

Finally, several important articles which appeared this year have been mounted after the parameters of the university's online royalty manager were configured to satisfy the legal demands of the publishers of these articles.

The final e-mail message reminds Dr. EveryUser that the file listing new approval books in the areas of Dr. EveryUser's interests is available. Dr. EveryUser ftp's this file and marks those citations for books which she believes are worth keeping. Since she is about to head over to the library, she prints several citations for items she wants to examine in more detail. She heads out to the library. She sends the revised file back to the ftp site.

She has a 1:00 appointment with one of the librarians. Once in the library she heads for the second floor where the library staff offices are located. Dr. EveryUser is meeting with the librarian to go over some of the preliminary work the librarian has done on some course-specific information resources instruction materials the librarian is constructing for one of Dr. EveryUser's classes. The librarian uses the computer in her office to demonstrate some of the general information instruction materials the library presently has mounted on the network, particularly some online interactive multimedia tutorials which the librarian designed. The librarian shows Dr. EveryUser a draft HyperCard stack which addresses the information needs for the term paper required for her class. After some discussion, the librarian gives Dr. EveryUser a quick tour of where the students can access these types of instructional materials within the library, showing her individual workstation access and a demonstration of what EveryUser's students will see in the second floor Library Education Multimedia Training Room. Dr. EveryUser finally decides that it would be easiest if the librarian could come to the class for part of one period and Dr. EveryUser will schedule one class in which the librarian can bring portable equipment for a demonstration. Finally, the pair go over some procedures for students who might want individual assistance on papers both in person and via e-mail. The librarian agrees to put a section in the class-specific information resources instructional materials which posts common questions/problems and gives solutions to them.

On the way out of the librarian's office, the librarian mentions to Dr. EveryUser that one of the important findings that came out of the user survey was that certain user groups had a need for current awareness contact with colleagues but often lacked formal electronic structures for doing so (e.g., listservers) and relied on one-on-one contact via the INTERNET or the BITNET. As an extension of the Creativity in Young Children database, would Dr. EveryUser be interested in a listserver for researchers in the area of creativity of young children? It could be a joint venture of CWRU and the Important Scholarly Society in which Dr. EveryUser is active. Would Dr. EveryUser meet with the librarian and someone from Integrated Network Services next week? Would Dr. EveryUser then approach the Important Scholarly Society about working on a joint grant with CWRU? Dr. EveryUser is interested and a meeting time is set up.

Dr. EveryUser needs to finish some final research for articles in progress and goes to the third floor locked carrel she requested for the summer to drop off her laptop computer. She already has most of the books in her carrel she wants to use, but she goes down to the first floor to pick up the current journals which she noted in the current awareness search list she had seen earlier in her office. While on the first floor she goes into the approval book viewing area and looks at the most interesting titles which she had seen earlier in the new approval books list. She marks on several of the approval slips that she wants the title delivered to her office as soon as it is available. Back in her carrel, her work with the new journals reminds her that she had found a reference to some very early work in creativity and had wished to see several articles from some older brittle journal runs in storage. She had sent an ILL request via the online library catalog. She had requested that the articles be digitized and sent to her folder on ILL's network server. She accesses the server with her laptop, which she has plugged into the carrel's network connection, and looks over the articles. She notes a reference to a German doctor with whom she was not familiar and sends the page with the reference down to one of the networked laser printers near the second floor in-depth

reference desk. She goes down to the second floor, picks up the page and heads for the reference collection nearby. This doctor is indeed not in the major biographical sources for her field so she goes to the in-depth reference desk and asks about other sources. One of the reference librarians says she will look in several other tools but also suggests that her colleague in his nearby office close by is very familiar with this type of information and Dr. EveryUser should also try him. Dr. EveryUser does so and that librarian goes out to coordinate the search with his colleague. They will send their results to Dr. EveryUser via e-mail.

Dr. EveryUser picks up her laptop and prepares to leave the library for the day. She goes by the Pre-Reference/Circulation desk and drops off a xerox of an article she wants on reserve. The library has worked with the university on copyright problems and the article can be scanned and put on a network folder. The circulation staff member goes over with the Dr. EveryUser where on the network the article will be found and will let her know via e-mail when it is mounted.

**Examples of Knowledge Management in an Art History Environment**

A faculty member wishing to assemble course materials might use the KM system to do the following:

*Search an online listing of relevant primary sources located in the Cleveland Museum of Art and compile the listing in a priority order of viewing or as the works related to given lecture topics.

*Search online slide collection guides for collections and individual slides relevant to given lectures. Make arrangements online to reserve the slides on the appropriate lecture dates. Where desired and where the classrooms facility are available, the faculty member might chose to present scanned images of the art work for detailed analysis and to emphasize points for students to note when viewing the works in the museum. The presentation of the digitized images would include the ability to manipulate the images (zooming in on details and enlarge them, rotating the image) and the ability to draw directly on the image to illustrate a point or technique.

*Ask students to do additional online searches to assemble a bibliography of recent journal publications that could be used eventually to produce related research papers. Students could, in turn, use the system to locate where the journals were hold or to obtain digitized copies of the articles in question.

*Consult an online listing of museum display catalogs to demonstrate the various thematic possibilities in organizing relevant materials for presentation.

*Create a required course reading list of secondary sources, with location and holdings information, and distribute the list to all students registered for the class.

*Search an online image catalog to compile a list of examples illustrating examples of lecture topics. Students could also view these images as well and could request full color hardcopy to use for study.

A critical feature of any Knowledge Management system is that it is constructed by a collaborative effort between librarians and the scholar, so that the control mechanisms involved produce highly relevant search results that match the scholars' information gathering and usage patterns.

## APPENDIX X:
## INTELLECTUAL COMMONS

by Lee J. White
Member, University Library Building Committee

I would like to add to my characterization of an intellectual commons one additional aspect: the central importance of library staff as an ingredient of an intellectual commons.

Currently the objective of most library staff who meet library users is to direct these users to sources of information where their questions and concerns can be answered. This may be viewed as a passive role in terms of users' obtaining the desired information. A more active role would consist of the situation where the library staff member serves directly as the information provider.

It is almost a certainty that the diversity and complexity of information sources will increase and can pose a confusing and bewildering set of choices to the user. The library staff member, or information specialist must first know about the user's domain of knowledge. The library staff member also must understand the diverse sources of information, being aware of the peculiarities and intricacies of each. Thus simply pointing to one of these information sources may not help the user much if the user cannot cope with the complexities of this source and run into blind alleys. The third capability of the information specialist requires the use and knowledge of current information technology. This will be a substantial challenge considering how quickly computer technology changes even today. It goes without saying that such a new kind of information specialist must be as courteous and accommodating as library staff are today.

The extent to which both the Library of the Future and the intellectual commons can be realized will depend upon recruiting and retaining such information specialists. If the Library of the Future cannot develop and/or hire this type of information specialist, then users will have to seek this assistance elsewhere on campus. Either another organization will emerge or each academic unit will be forced to develop this capability, a most expensive alternative for the University.

The final observation is how this type of interaction will affect the design of the physical facility currently known as the "reference desk." This consists of a large service counter in which a brief dialogue ends by the reference librarian pointing out the use of a terminal, or directing the user to a specific book or reference. When that user instead speaks to the information specialist, the interaction may be extensive and cannot occur over the counter, but requires more of a quasi-separate room. This entirely different type of interaction will be part of the intellectual commons.

It will be a number of years before this vision is realized. This means that the Kelvin Smith Library will have to be designed to accommodate today's staff and expectations of library users and yet be flexible enough to change with changes in library staff and user interaction modes.

## APPENDIX XII:
## NEW PATTERNS OF THINKING AND INTERACTING

"Computers are simulation engines--powerful tools for mental-model building. We are only beginning to see them as such. All of our thinking tools, from language to logic, involve an acquired skill at constructing mental models and communicating them. And the power of these mental models is that they give the whole species a platform for thinking and expressing ourselves more effectively, for communicating and collaborating and building the next higher level of symbolic thought. The tool for building that next level is the computer, and as we learn to use it better, we are going to change the way we see the world, for such is the nature of powerful intellectual instruments."[1]

This section is not intended to provide an exhaustive analysis of changing patterns of thinking made possible by a tool which enables all of the senses to engage intellectual concepts; or to combine in one intellectual product sound, text, numbers, pictures, and moving images. However, it is essential that we illustrate yet another *principle* which we are reflecting in the programming of the Smith Library, i.e., that the building will support varied patterns of thinking.

Everything about the technological context of the Electronic Learning Environment implies support for new patterns of teaching, learning, and scholarship--including changing roles and responsibilities for the library. We have already noted that the Smith Library's mission is the fostering of graceful transitions. How can we do that given what we have learned from the user surveys? Among the many findings are the following:

- Consistent requests for more digitized formats
- Requests for image databases
- Requests for more photocopy machines
- Requests for the ability to easily browse current periodicals
- Requests for scanning equipment
- Requests for color photocopy machines
- Requests for color printers
- Requests for networked access to digitized formats
- Requests for access to high-powered microcomputing equipment
- Requests to download from Euclid Plus into private database packages
- Requests for the University Library to be open longer hours
- Requests for easy-to-use system interfaces
- Requests for librarian assistance of all sorts
- Requests for training

Something new is at work as faculty and students look to their library. Clearly, the Electronic Learning Environment is already taking hold. The implications for the Smith Library programming are, then, manifold. First, and foremost, is the faculty and students desire for more tools at hand as they interact with owned collections--that is the purpose of photocopy machines and scanners, for example.

As well, faculty and students are requesting in their new library almost all of the hardware, software, and information/knowledge resources which are integral to the information and educational technologies of the Electronic Learning Environment and the KIMS.

Librarians are the people who create the libraries through which human beings and recorded knowledge are brought together in as fruitful a relationship as it is humanly possible to be. Faculty

members and students are telling us that they need the continuing assistance of members of the library staff.

## Future Growth of Collections: Publishing Trends and Electronic Information Storage[A]

Trends in the flow and control of scholarly information and the rapid development of information technologies have deeply affected libraries in the past twenty years and will continue to do so. One exigency that will not change, however, is the need for space for expanding print collections. Despite the number of new formats for information, book publishing is not shrinking, it is growing. And the lesson of history is that new technologies tend not to replace older ones but to supplement them. Movies did not replace books, nor television either of them. VCR's have not replaced movies or television. In 1950, when television began its rapid integration into the American lifestyle, 11,022[2] books were published in the United States. In 1970, when the impact of the computer exploded, that number reached 36,071[3]. In 1989, after almost 40 years of television, 20 years of mainframe computer use, and ten years of micro-computer use, 45,718[4] books were published in the U.S.—a 310% increase. And this increase is more than matched by that of worldwide publishing which has increased from 169,638[5] in 1950 to 835,000[6] in 1987—a 392% increase. The worldwide explosion in publication directly affects UF because the UF Libraries now spend almost 50% of the library materials budget on books, journals and documents from Europe, Central and South America, Africa, Asia, and Australia.

Online databases, digitized images, video and audio storage formats are becoming permanent parts of research library collections. The problems inherent in preserving and maintaining access to information stored in such formats (such as the complexity of preserving and providing access to software created for now-obsolete hardware) are only beginning to be identified and addressed in the United States. When the picture is expanded to include the rest of the world, problems multiply. Electronic publishing has advanced slowly and fitfully, and as an industry is still far from mature. Investment is significant and return on investment small—particularly in more esoteric areas where only a few researchers world-wide are interested in the data. Issues of critical mass and depth of file in relation to probable users have yet to be worked out. The lack of good graphics capability in electronically published journals limits their usefulness. Appropriate mechanisms for assigning responsibility for maintenance of access to electronically published material over the long term have yet to be devised and questions regarding how material will be "refereed" by disciplinary experts and "cataloged" or structured to enter library catalogs

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A Excerpted from Canelas, Dale B. "Facilities Program for Library West", unpublished, University of Florida, March, 1991, pages 5-7.

[2] Historical Statistics of the United States: Colonial Times to the Present. Washington, D.C., US Department of Commerce, Bureau of the Census, 1975, p. 808.

[3] Ibid.

[4] Library and Book Trade Almanac, 35th ed. N.Y., R. R. Bowker, c1990, p. 480.

[5] UNESCO Statistical Yearbook, 1964. Table 28.

[6] UNESCO Statistical Yearbook, 1989. Table 6.11.

have yet to be answered. The American Chemical Society, which has a great deal of experience with electronic publishing, recently summarized problems with *Chemical Journals Online* as follows: "mounting a full-text database is still problematic; the conversion process is still very expensive, since a tape produced for computer-based phototypography is usually not a data-tape ready for retrieval; the storage costs are high; the education of the end-user is complex; the consolidation of bibliographical information with the full text is considered essential but often ignored."[7]

The new formats must be added to libraries because they provide information that cannot be stored and accessed in traditional ways and they are essential to meet university requirements for access to information. But with the problems outlined above and the continued explosion of worldwide publication, they will not appreciably reduce the numbers of books and journals flooding into research libraries. Furthermore, they do require significantly more user space than traditional library study spaces. This means that we need space not only for the books and journals we have traditionally stored, but also for the micro-computers, terminals, CD ROM readers, video-disc players, and other equipment without which faculty and students could not use electronic data. Like other new technologies, access to electronic information is an addition to or traditional services rather than a replacement of them.

**Collection Growth.** In 1944, Fremont Rider pointed out in *The Scholar and the Future of the Research University*, that "Growth [in university libraries] has continued without any significant change of rate...for over thirty decades, and at a rate so uniform over so many years, and so uniform in so many different libraries, that it might almost seem as though some natural law were at work."[8] Mr. Rider, after a study for large research libraries that went back to the founding of Harvard and Yale, showed that research libraries double in size approximately every fifteen years. Rider was followed up by the Purdue studies, a series of nine studies appearing annually from 1965 to 1973, devoted to the description and forecasting of specific library growth variables which predicted the future size of specific research library collections. The 1965 forecasts for the 1980 collection size of fifty-eight research libraries (which predicted approximate doubling in the fifteen year period) were accurate to within 2.5% of the 1980 collection sizes. A 1987 study, *Research Library Trends, 1951-1980 and Beyond*, shows similar projections for the next twenty years.

Based on the rapid proliferation of publishing in the third world, increasing domestic print publishing, and given the technical problems with preservation of electronic data and access to it years later with different

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[7]Rutimann, Hans. "Report to RLG on Electronic Publishing," unpublished. Palo Alto, California, RLG, 1989.

[8]Rider, Fremont. The Scholar and the Future of the Research University. N.Y. Hadham Press, 1944, pp. 15-16.

equipment and software, it is most unlikely that printed materials will disappear for many years. Research libraries serve specialists interested in information that may be of interest to very few others for many years, the cost of maintaining that data accessible electronically for a lengthy period cannot be recouped by publishers under present economic conditions. Research libraries will continue to maintain and add to their large print collections for at least the next twenty years--by which time our collection will have doubled again.

**A vision for the future.** The University of Florida's improving academic programs need the support of a library that brings together the humanities and social science collections and is designed to emphasize support of the scholarly needs of faculty and students. As we look toward the 21st century, today's very uncomfortable space situation is rapidly becoming intolerable. The University of Florida is proceeding with its master plan for expansions and additions to academic offerings—new PhD programs have been added yearly for the past five years. An increased student body is being discussed as is expansion in the ranks of graduate students. With stabilized and gradually increasing funding for library materials, we anticipate steady growth that will almost double the collections housed in the central research library complex between now and 2010. Microforms will grow at the present rate or higher as this format is used to address preservation problems. And, we project an increase in the acquisition of non-print materials—especially electronic format, audio and video materials—which are needed for academic programs but are currently collected at very minimal levels because space to house the collections and equipment needed to access them are lacking. It is also anticipated that the number of students will increase by 18% and library staff by 30% over the existing staff level (from 204 to 265 in Libraries East and West).

The library is central to flourishing humanities and social science disciplines. The proposed library addition will create, in the physical heart of the campus, an accessible environment which will open up the scholar of the 21st century to information in all forms collected and organized by the library in support of UF academic programs. It would provide for a good basic research collection of 2.2 million volumes--a small collection by peer institution standards--and would create an environment where scholars can move easily between books, micro and electronic formats by providing readily available service space for each, so that the flow of ideas and research need not be interrupted. In increasing the amount and diversity of reading space for students and faculty, we create habitats suited to learning and teaching in multiple disciplines by diverse users. The new "Library West" would have a central stack area surrounded by small reading areas with combinations of carrels, tables, group study rooms, and closed studies so that scholars at every level would find appropriate working conditions as they use the needed collections. About 4,000 library users could be seated at once. Each floor would have photocopiers, catalog terminals, wired rooms for the use of personal computers, etc. Noise producing activities would be isolated from study areas. The main service areas

would be on the first or the first and second floors, leaving the upper floors for quiet study and reflection. There would be class/seminar facilities so that faculty could bring classes for instruction in the use of electronic information or use of library collections. Such a building would create library conditions supportive of the outstanding faculty and student body, who currently have a very difficult time pursuing their academic work in the library.

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October 20, 1993

Dr. Charles A. Kiesler
MU Chancellor
105 Jesse Hall

Dear Chancellor Kiesler:

Enclosed is a report prepared by the MU Campus Library Committee that describes factors we believe must be considered in a careful evaluation of future MU Library space and storage requirements. We recognize the need for this on-going evaluation, at both the University and Campus levels, to determine the most cost-effective means of providing high-quality library services to the University community and the citizens of Missouri.

We are particularly concerned that Library quality and services be at least maintained, if not improved, by the decisions that result from this evaluation. With this objective, our report includes data on the current status of patron seating space and remote storage at the MU Libraries and comparable data from other university research libraries. We include selected data from our recent survey of MU faculty and students on their use of Ellis Library. Full results of the survey, which was conducted last spring by the MU Media Research Bureau, are included as an appendix.

Advancing library technologies will certainly affect the future space and storage needs of the MU Libraries and must be carefully evaluated. However, we believe there are great uncertainties in such an assessment. The last section of our report includes several questions that we believe must be answered in order to evaluate how advancing technologies will be implemented and how they may impact Library space and user services.

We appreciate President Russell's decision to employ a panel of outside experts to evaluate the UM Libraries future space and storage needs. Because decisions on this issue will be made at both the University and the Campus levels, we have asked Vice President Wallace to forward copies of our report to members of the President's panel. Representatives of our committee plan to meet with the panel during their visits to discuss our concerns and their opinions of the issues. At any point in this process, we would be glad to discuss our concerns with you and answer any questions you have about our report.

Sincerely,

Robert L. Bauer
Associate Professor & Chair,
MU Campus Library Committee

encl.
cc: G. Brouder
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# Factors to Consider in Evaluating Future Space and Storage Needs of the MU Libraries: A Library Patron's Perspective

Prepared by

The MU Campus Library Committee
of Faculty, Staff and Students

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## INTRODUCTION AND OVERVIEW

The MU Campus Library Committee is interested in insuring that the concerns of students, staff and faculty are considered during the on-going evaluation of UM Library space and storage needs.

We recognize the need for this evaluation to determine the most cost-effective means of continuing to provide high-quality library services to the University community and the citizens of Missouri. We hope that decisions on this matter receive careful consideration, as they will have an impact on library services for decades to come.

We realize that this is not a simple issue to evaluate. It requires evaluating University capital improvement priorities, the short-term and mid-term impact of emerging library technologies, space and storage options available to each of the four campuses of the University, and the impact of various options on the Library's patrons.

Most of this report is concerned with library space and storage issues from the library patron's point of view. Our objective is to assist University administrators in their current evaluation of library space and storage needs on both the Columbia campus and the other University campuses. We emphasize student and faculty concerns about how these needs will be met, and we outline critical factors we believe must be considered to make sound decisions about the use and development of space and storage in the UM Library system. We are particularly interested that this evaluation take into consideration differences in the nature of the four campuses of the University and the long-standing plans to expand Ellis Library on the MU campus.

In order to assist the evaluation, we have compiled in this report information about library space and remote storage on the MU campus. Because a significant percentage of library

space is typically devoted to user study space, we present data on architectural standards for library study space, how much study space the MU Libraries currently provide, and how we compare in this area with other university research libraries. We also present information on the number of volumes from the MU Libraries that are in long-term storage and how this number compares with volumes in long-term storage at comparable university research libraries. We include selected information from our recent survey of MU students and faculty on their use of Ellis Library; full survey results and methods are included as an Appendix. Finally, we discuss the possible impact of emerging library technologies, and consider several critical questions that we believe must be answered to evaluate the impact of advancing technologies on future space and storage needs of the UM Libraries.

## LIBRARY STUDY SPACE

The most widely quoted architectural standards for library construction are those published by Leighton and Weber (1986) in their book "Planning Academic and Research Library Buildings (2nd ed.)". This reference provides detailed recommendations for various types of study space for undergraduate students, graduate students, and faculty (see Appendix B of Leighton and Weber, 1986 for detail). The most significant general recommendations cover the percentage of students for whom seating accommodations are recommended (Leighton and Weber, Table B.7 reproduced on following page). If we consider MU to be a typical residential

**Percentage of Students For Whom Seating Accommodations are Suggested (Table B.7. of Leighton and Weber, 1986)**

| Type of Institution | Percentage |
|---|---|
| Graduate-level professional School library | 50-100 |
| Arts and humanities research branch | 50-80 |
| Superior residential coeducational liberal arts college in rural area of small town | 50-60 |
| Superior residential liberal arts college for men or women in rural area or small town | 45-50 |
| Superior residential liberal arts college in a small city | 40-45 |
| Graduate-level science research branch | 35-50 |
| Superior residential university | 35-40 |
| Typical residential university | 25-30 |
| Typical commuting university | 10-20 |

university, Leighton and Weber recommend seating accommodations for 25-30% of enrolled students.

As of February 1992, the MU Libraries, including the Law Library and all branch libraries, had 2686 seats, of which 2132 were in general seating areas, 183 were specialized seats (microcomputer & CD-ROM work stations, index tables, etc.), and 371 were in locked carrels (not available to undergraduate students). This number of available seats would accommodate 10-11% of our enrolled students. These data come from a survey of all members of the Association of Research Libraries (ARL), which comprises the top 120 research libraries in the United States and Canada; 108 of the members are academic research libraries. Table 1 shows how MU's total library seating capacity compares with selected ARL libraries. Total available seating as a ratio of available space (in $ft^2$) is tabulated in column 4, and these data are plotted on a sorted histogram by university in Figure 1. MU ranks 16th out of the 18 universities in terms of the portion of total library space devoted to study space. The percentage of students at a university that can be accommodated by library seating is tabulated in column 6, and these data are plotted as a sorted histogram in Figure 2. MU ranks 15th out of the 18 universities in terms of the percentage of students seatable.

It is apparent from Figure 2 and Table 1 that relatively few of the universities adhere to Leighton and Weber's recommended seating accommodations. The more important point, however, is that MU ranks near the bottom in terms of the library study space available for students and faculty. If the study space allotted to locked carrels is taken into account, even less

| TABLE 1. ARL LIBRARY SEATING STATISTICS - BIG 8, BIG 10 & SELECTED PRIVATE UNIVERSITIES | | | | | |
|---|---|---|---|---|---|
| University | Total Seats | Total Space | Seats/Space * 100 | # Students | % Student Seating |
| **BIG 8 SCHOOLS** | | | | | |
| Colorado | 3,801 | 379,072 | 1.003 | 25,176 | 15.10 |
| Iowa State | 2,878 | 259,414 | 1.109 | 25,339 | 11.36 |
| Kansas | 3,941 | 425,501 | 0.926 | 28,045 | 14.05 |
| Missouri | 2,686 | 327,072 | 0.821 | 24,972 | 10.76 |
| Nebraska | 1,863 | 213,859 | 0.871 | 24,453 | 7.62 |
| Oklahoma | 4,139 | 400,121 | 1.034 | 19,246 | 21.51 |
| Oklahoma State | 1,854 | 236,000 | 0.786 | 19,591 | 9.46 |
| (Kansas State is not a member of ARL) | | | | | |
| **BIG 10 SCHOOLS** | | | | | |
| Illinois | 5,987 | 615,086 | 0.973 | 35,766 | 16.74 |
| Indiana | 8,002 | 624,853 | 1.281 | 35,453 | 22.57 |
| Iowa | 8,381 | 476,590 | 1.759 | 28,045 | 29.88 |
| Michigan | 7,217 | 904,467 | 0.798 | 36,306 | 19.88 |
| Michigan State | 4,348 | 348,390 | 1.248 | 44,317 | 9.81 |
| Minnesota | 5,636 | 675,847 | 0.834 | 40,972 | 13.76 |
| Ohio State -- did not submit data for the survey | | | | | |
| Northwestern | 5,532 | 503,495 | 1.099 | 14,684 | 37.67 |
| Purdue | 4,135 | 324,922 | 1.273 | 35,647 | 11.60 |
| Wisconsin | 8,282 | 787,625 | 1.052 | 40,905 | 20.25 |
| **PRIVATE SCHOOLS** | | | | | |
| Washington U. St. L. | 3,051 | 309,588 | 0.986 | 9,701 | 31.45 |
| Vanderbilt | 2,771 | 254,531 | 1.089 | 9,236 | 30.00 |
| **ARL MEDIANS** | 2,818 | 297,000 | 0.949 | | |

Figure 1

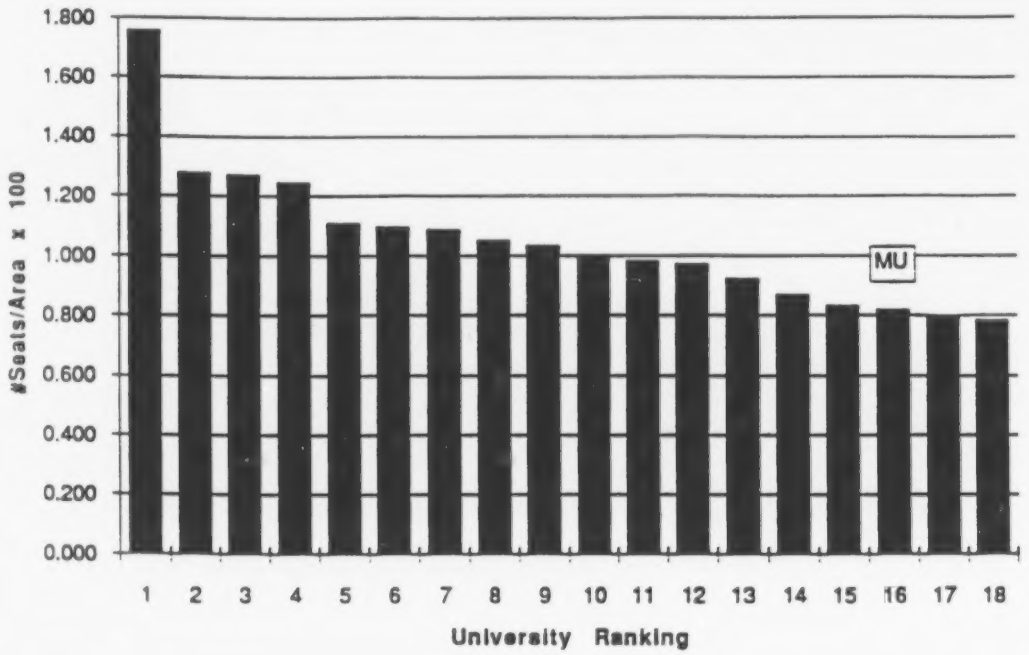
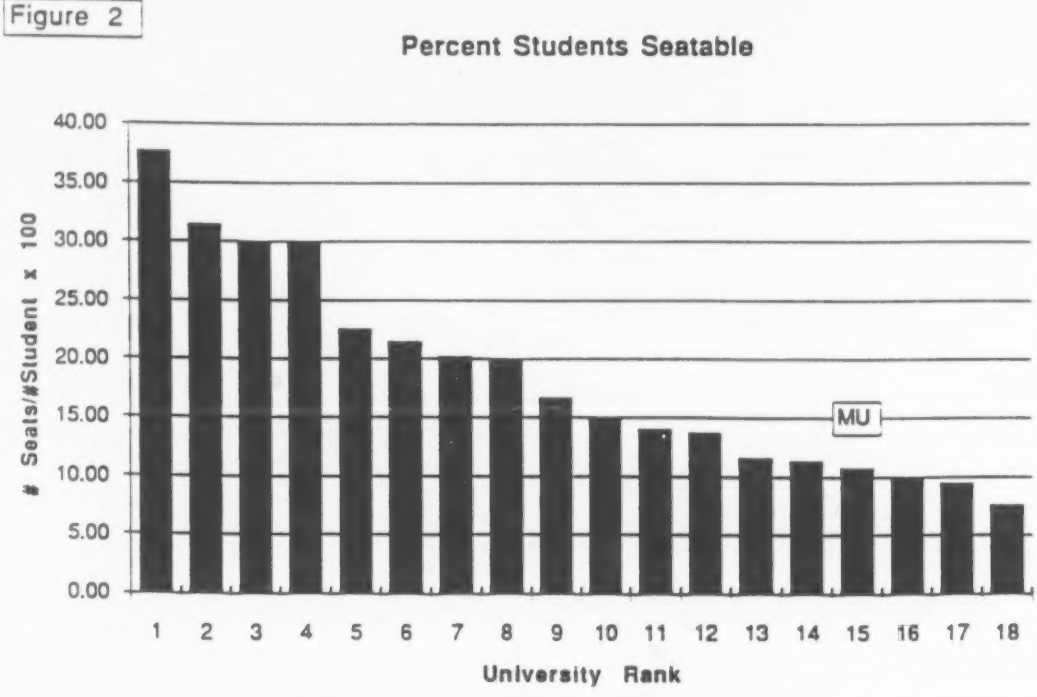



Figure 2



study space is available to students. Comparing just Big 8 universities, MU ranks with Nebraska and Oklahoma State at the bottom in terms of both seating per area and seating as a percentage of total student enrollment.

We believe that further reduction in available student study space would adversely affect students' abilities to use the MU Libraries. Our survey of MU students indicates that over half of the students surveyed use Ellis Library at least once a week. Over half of the MU faculty made classroom assignments last semester that required students to use Ellis Library. Of these, 90% included research paper assignments. During their last visit to Ellis Library, over 70% of undergraduate students and over 80% of graduate students used library materials, but over 60% of undergraduates and 55% of graduate students also studied in Ellis library using their own materials. Nearly 40% of undergraduates and 50% of graduate students surveyed considered the availability of individual study or research space in Ellis Library to be of high importance. Over 60% of undergraduate students indicated that their major study location during the day was their apartment, dorm or home, but nearly 30% indicated Ellis Library or other campus buildings as their major daytime study location.

## VOLUMES HELD IN REMOTE STORAGE

The same ARL survey from which the library seating data were compiled reported the number of volumes each library had shelved in remote storage (Table 2). MU, with 400,000 volumes in storage as of 1991, had more volumes in remote storage than any of the other Big

| TABLE 2 - VOLUMES IN REMOTE STORAGE | | | |
|---|---|---|---|
| University | Total Volumes (1991 data) | # Volumes Stored (1991 data) | % of Volumes Stored |
| **BIG 8 SCHOOLS** | | | |
| Colorado | 2349410 | 0 | 0.00 |
| Iowa State | 1914646 | 1,600 | 0.08 |
| Kansas | 2960765 | 0 | 0.00 |
| Missouri | 2528304 | 400,000 | 15.82 |
| Nebraska | 2059989 | 0 | 0.00 |
| Oklahoma | 2335957 | 0 | 0.00 |
| Oklahoma State | 1595257 | 0 | 0.00 |
| (Kansas State is not a member of ARL) | | | |
| | | | |
| **BIG 10 SCHOOLS** | | | |
| Illinois | 7918951 | 0 | 0.00 |
| Indiana | 5099250 | 200,000 | 3.92 |
| Iowa | 3174269 | 0 | 0.00 |
| Michigan | 6579152 | 1,230,000 | 18.70 |
| Michigan State | 2811363 | 173,323 | 6.17 |
| Minnesota | 4761630 | 0 | 0.00 |
| Ohio State did not submit data for the survey | | | |
| Northwestern | 3550250 | 55,000 | 1.55 |
| Purdue | 1968656 | 349,587 | 17.76 |
| Wisconsin | 5133457 | data unavailable | |
| | | | |
| | | | |
| **PRIVATE SCHOOLS** | | | |
| Washington U. St. L. | 2642917 | 133,400 | 5.05 |
| Vanderbilt | 1981132 | 300,000 | 15.14 |

8, Big 10, or selected private university libraries except for the University of Michigan. Of these comparison schools, only Michigan and Purdue had a larger percentage of their volumes in storage than MU. Of the 99 ARL libraries that responded to the survey, 71 of the libraries used remote storage for volumes. Only 12 of these had more total volumes in remote storage than MU. These libraries, ordered by the percentage of total volumes in storage, are: U.C.L.A(38.8%), Colorado State(34.9%), MIT(21.4%), UC San Diego(20.7%), Wayne State(19.0%), Michigan(18.7%), UC Berkeley(18.6%), Duke(14.5%), Princeton(14.5%), Texas(7.7%), Harvard(5.7%), and Boston Public (total volumes data not available). Of these schools, only Colorado State and MIT have fewer total volumes than MU.

We recognize the need to keep volumes in remote storage as a cost-effective means of maintaining part of the MU Library's collection. However, as the percentage of total library volumes maintained in remote storage increases, the more difficult it becomes to make decisions about what should be stored and the greater the number of requests for retrieval of stored materials. In our survey of MU students and faculty, over 30% of faculty and graduate students and 12% of undergraduates reported needing library materials housed in remote storage during the past year. Faculty were further queried about factors they considered to be most important in the operation of a remote storage facility. Delivery time of requested materials emerged as the most important (over 70% indicated that delivery time of requested materials was very important). The ability to browse the stored collection was the second most important consideration (nearly 60% indicated that browsing was very important).

We believe that operation of a remote storage facility must take into consideration relationships among the projected number of volumes to be stored, the request rate for volumes, and staffing of the facility to establish an acceptable delivery time for patrons. Staffing in this situation is critical, and the cost of staffing a remote storage facility at a level sufficient to result in an acceptable delivery time must be considered. The ability to browse remotely stored collections is typically quite limited, at best. As the percentage of the library collection housed in remote storage increases, the fewer the volumes available for direct browsing. To accommodate browsing of remotely stored materials, we believe stored materials should, at the very least, be browsable via an online database. Because these materials would not be immediately available to determine their significance to the patron, requests for stored materials will increase significantly. We believe that the personnel cost of this increased rate of request and the cost of maintaining an online data base of stored materials must be considered in evaluating the cost/benefit of remote storage.

## THE IMPACT OF ADVANCING LIBRARY TECHNOLOGIES

The most important questions to consider in evaluating the space and storage needs of the future library involve the impact of new technologies. We believe, however, that these are some of the most difficult questions to answer. Few people knowledgeable about library technologies would dismiss the importance of computer technologies for the future of information retrieval. Distributed client-server information systems on the Internet or via private

networks developed by vendors will have a tremendous impact on the way we obtain information. The rapid evolution of graphical user interfaces will continue to make online computing and information retrieval available to a wider and wider audience. Nevertheless, for our evaluation of future and current space and storage needs of the UM Libraries, the critical questions are how much, how soon, and at what cost.

How much of the current periodical literature in academic disciplines ranging from art to engineering to child psychology will be available online? How many hard-copy journal subscriptions will be available for cancellation at what savings in shelf space? How soon can we expect to see this savings in shelf space? How much will it cost to install the required technologies? How soon and at what cost will a fully integrated UM system-wide network allow online retrieval of information? What will it cost to obtain online journal articles, and who will pay the price -- the University, students, faculty? At current document delivery rates, in the range of $30/article, few faculty and fewer students take advantage of this service.

Ultimately, the answers to many of these questions will depend on the economics of publishing and the expected profit margins of publishers, not on the availability of viable technologies. Before significant savings in library shelf space can be realized, large numbers of major publishers will have to determine that the profit in supplying journal articles electronically will exceed their projected profits from marketing, selling, and distributing hard-copy journals. Certainly the price of advanced computer technologies will be a factor in this decision, but profit motive, not the availability of appropriate technologies, will be the major

force driving the advance of the electronic library. We believe that the evolution of a publisher's profit decisions is one of the greatest uncertainties in determining the impact of advancing technologies on the UM Libraries' future space and storage needs.

If the University's decisions on the long-term space requirements for the UM Libraries are to be based in part on projections of the impact of advancing library technologies, we believe it is critical that nationally recognized consultants, well versed in the economics of international academic publishing as well as the state of the art in online information technology, be hired to evaluate the impact of these advances at the UM Libraries over at least the next ten years.

## SUMMARY

As representatives of the students, staff and faculty of the MU Campus, we believe that decisions regarding housing and access to the University Library collection must take into consideration patron concerns about user space and access to the library collection. We are particularly concerned that projections of costs and savings be consistent with an acceptable level of user space and services. We further believe that an evaluation of the impact of advancing library technologies must consider realistic estimates of the rate of technological advance, the rate of publisher/vender applications of these technologies, and how the cost of electronic publishing will be born by the University as well as students, staff and faculty.

We look forward to discussing these matters with the University administration and members of the panel of consultants hired to review this issue.

# APPENDIX

## ELLIS LIBRARY SURVEY

### PURPOSE

The purpose of this survey was to gather information from members of the University community on current use of and satisfaction with Ellis Library. The Campus Library Committee (CLC) believes that this information is an important part of optimal planning for future library space and storage needs.

### METHODS

CLC members generated survey items for undergraduate, graduate, and faculty samples. Similar surveys from other major research institutions (Purdue, UCSB) were reviewed and David Leuthold, PhD (professor emeritus, political science) and Judith Sylvester, director of the School of Journalism Media Research Bureau) were consulted for final item selection and wording. This survey was conducted by the MRB with funding provided by the Office of the Provost.

Four Hundred and thirty-four individuals completed the telephone interviews conducted by MRB between April 26 and May 10, 1993. Undergraduate students constituted 47% (n=203), graduate students 29% (n=127), and faculty 24% (n=104) of the total sample. Lists of potential respondents were supplied to the MRB from the MU Registrars Office (graduate and undergraduate students) and MU Employee Benefits Office (faculty). These lists consisted of

names selected at random from the total student and faculty population using the following criteria: current Columbia residence with a residential telephone number, full-time faculty of any rank, and not attached to a school or department with its own library (i.e., Engineering, Medicine, Law, Veterinary Medicine, Geology, Mathematics, or Journalism). To allow for nonrespondents, lists forwarded to MRB contained four times as many individuals as estimated to be required for an adequate sample size. MRB then re-ordered these alphabetical listings and performed interviews until the accepting sample was of adequate size to allow for meaningful statistical analyses of the three sub groups. The standard error of the survey is less than 5%. On average, each interview lasted from 3 to 5 minutes.

## DESCRIPTION OF FACULTY SAMPLE

1) Rank: 40% professor, 34% Associate Professor, 20% Assistant Professor, 6% Instructor.

2) Primary responsibility: 12% research, 14% teaching, 2% extension, 70% combined; 72% report research effort at 25-50%, 77% report teaching effort at 25-50%, 25% report some extension responsiblities.

3) Time at MU: 28%, five years of less; 17%, 6-9 years; 28%,10-20 years, and 27%, more than 20 years.

## RESULTS

Results are presented in percentages by sub groups for items common to all interviews. Responses to items unique to a group are presented last. No statistical analysis has been done to compare similarity of sub group responses.

**Q: Have you used Ellis Library during this semester?**

| | | |
|---|---|---|
| Yes = | Undergraduate | 94% |
| | Graduate | 95% |
| | Faculty | 85% |

Note: The respondents who said they had not used Ellis were asked why not. Responses included: no need, no time, used a departmental library, space was inadequate, collections were inadequate, or respondent was off campus (n=10).

**Q: During the past year, how many times have you needed to use library materials located off campus at the Library Annex?**

| | | |
|---|---|---|
| Never= | Undergraduate | 88% |
| | Graduate | 67% |
| | Faculty | 70% |

Those who reported that had needed materials from the Annex, were asked:

**How often did you actually request material.**

Percent requesting materials:

| | |
|---|---|
| Undergraduate | 68% |
| Graduate | 76% |
| Faculty | 90% |

**Q: Do you have computer terminal access to LUMIN (the library's on-line catalog) from a location outside the library?**

| | | |
|---|---|---|
| Yes= | Undergraduate | 17% |
| | Graduate | 40% |
| | Faculty | 65% |

Those who reported that they had remote access to LUMIN were asked:

**Has this access increased or decreased your on-site use of Ellis library?**

| | | | | |
|---|---|---|---|---|
| Undergraduate: | Increased | = 32% | No change | = 59% |
| Graduate: | Increased | = 31% | No change | = 61% |
| Faculty: | Increased | = 34% | No change | = 59% |

**Q: How often have you used Ellis Library during the past month?**

At least once daily.

| | |
|---|---|
| Undergraduate | 8% |
| Graduate | 13% |
| Faculty | 2% |

1-5 times a week.

| | |
|---|---|
| Undergraduate | 48% |
| Graduate | 46% |
| Faculty | 60% |

2-3 times a month.

| | |
|---|---|
| Undergraduate | 26% |
| Graduate | 17% |
| Faculty | 17% |

Less than once a month.

| | |
|---|---|
| Undergraduate | 14% |
| Graduate | 11% |
| Faculty | 13% |

**Q: One your last visit to Ellis Library did you do any of the following?**

**General reading, study or research with your own materials.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 61% |
| | Graduate | 55% |
| | Faculty | 17% |

**General reading, study of research using library materials.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 71% |
| | Graduate | 84% |
| | Faculty | 86% |

**Group study.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 15% |
| | Graduate | 8% |
| | Faculty | na |

**Search for book or journal article.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 73% |
| | Graduate | 91% |
| | Faculty | 93% |

**Obtain reserve materials.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 31% |
| | Graduate | 38% |
| | Faculty | na |

**Browse the shelves.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 41% |
| | Graduate | 51% |
| | Faculty | 60% |

**Consult a librarian.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 31% |
| | Graduate | 43% |
| | Faculty | 31% |

**Use photocopy or microform services.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 72% |
| | Graduate | 75% |
| | Faculty | 56% |

**Use library computers or terminals.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 58% |
| | Graduate | 66% |
| | Faculty | 58% |

**Use a locker.**

| | | |
|---|---|---|
| Yes= | Undergraduate | 2% |
| | Graduate | 7% |
| | Faculty | na |

**Q: a) Is individual study or research space of high, medium or low importance to you? b) During the last semester, was it very difficult, slightly difficult or not difficult for you to find individual study or research space?**

Undergraduate:

High importance 39%; low importance 20%
Very-slightly difficult 31%; not difficult 69%

Graduate:

High importance 49%; low importance 24%
Very-slightly difficult 30%; not difficult 70%

STUDENT RESPONDENTS ONLY:

**Q: a) Is group study space of high, medium or low importance to you? b) During this last semester was it very difficult, slightly difficult or not difficult for you to find group study space?**

Undergraduate:

High importance 10%; low importance 62%
Very-slightly difficult 29%; not difficult 71%

Graduate:

High importance 7%; low importance 79%
Very-slightly difficult 23%; not difficult 77%

**Q: (undergraduates only) What is you major study location during the day?**

| | |
|---|---|
| Apartment/dorm/home | = 61% |
| Ellis Library | = 14% |
| Other campus library | = 1.5% |
| Other campus or classroom building | = 15% |
| Union/Brady Commons | = 6% |

**FACULTY RESPONDENTS ONLY:**

**Q: If you have not used Ellis during the semester was it for any of the following reasons?**

| | |
|---|---|
| Inadequate library staff | No = 100% |
| Inadequate space | No = 94% |
| Inadequate collection | No = 81% |
| Other | None= 96% |

**Q: How many books, if any, do you now have checked out from Ellis Library?**

None = 35%, 1-7 = 35%, 10 or more = 30%.

**Q: How often have you made assignments this semester that require students to use Ellis library?**

Never = 46%, once a week or more = 22%,
1-3 times a month = 23%, at least once = 10%.

**Do your assignments require?**

| | |
|---|---|
| Reserve materials | = 52% |
| Group study | = 8% |
| Research for paper | = 90% |
| Computer/terminals use | = 56% |

**Q: Does Ellis met your research needs?**

Fully = 22%, moderately well = 65%, poorly = 13%, no = 1%

**Q: What problems have you encountered that inhibit your research?**

| | |
|---|---|
| Inadequate collections, particularly journals | = 48% |
| Slow Interlibrary loans | = 8% |
| Access to annex | = 3% |
| Access to terminals | = 2% |
| Hours of operation | = 2% |
| Library organization | = 3% |
| Other | = 2% |

**Q: The university is considering a central facility for remote storage of books from all four campuses. We are interested in determining how important certain aspects of this facility might be to faculty. For each of the following, please indicate whether this aspect of the facility would be very important, slightly important or not important to you.**

**a) Time required to deliver requested materials.**

Very important = 73%, slightly = 24%

**b) Ability to browse by subject area?**

Very important = 58%, slightly = 30%, not = 12%

**c) Proximity to the Columbia campus?**

Very important = 68%, slightly = 19%, not = 13%

**d) Hours of operation?**

Very important = 36%, slightly = 48%, not = 16%

**e) Continued ownership of materials by a specific campus?**

Very important = 20%, slightly = 24%, not = 57%

University of Missouri - Columbia

Outline for Space Study for UM Library Directors

I. Current Usage of Space.

A. Square Footage breakdowns of stacks, staff, and student space.

B. And/or, currently available space for expansion (if any) in these areas.

II. Projections of Space Needs for the next five years (ten years is too long to project in these changing times).

A. Book/journal shelving needs through 1997 or 1998, based upon either current acquisitions, or current acquisitions minus journal cuts, and/or current acquisitions minus some given percentage each year for electronic publishing (for example 10% less each year in volume additions to the MU Libraries only gains us 1/2 year in shelving capacity).

B. Assume staff constant for next five years.

C. Space needed for new technologies:

1. PC/LANS (to access mainframe databases).
2. CD-ROMS in the reference areas.
3. Video's/Recorded Sound Collections.
4. Full text database PC's in reading or reference areas of the Libraries.

Narrative Note: There is not much persuasive evidence in the academic environment that the development of new electronic access points to information will decrease traffic to a central facility. Unil electronic networks fill all the needs served by a library facility, both intellectual and sociological, networks are best considered a supplement to, rather than a substitute for, a central library.

D. Need for Group Study Rooms, based upon current teaching assignments (UNC has 36, MU has 2). Students in all subject areas are increasingly assigned group projects and class presentations (similar to real world projects).

E. Faculty Study needs (UNC has 150, MU 28).

F. Ph.D. Studies (UNC has 500, MU 50).

G. Graduate and Undergraduate needs (we can only seat 6% of the student body vs. a recommended 15-25%).

Narrtive note: Even in an electronically networked campus, students need a well-designed facility for study, and prefer that the space be shared by other readers, though they also want a secure individual space for themselves. Other spaces on campus, such as classrooms and residence hall rooms, usually are not adequate.

III. Alternatives and Recommendations.

A. Obtain (another, MU) off campus Annex
   1. Buy larger facility to combine annexes.
   2. Lease additional space.

B. Build underground storage facility adjacent to current Library in green space (MU).

C. High Density Addition to Ellis (MU), using compact shelving, on rollers, similar to Univ. of Illinois additions.

D. Short term alternatives.
   1. After 1997 pile books in aisles/boxes in Ellis.
   2. Constant shifting (labor intensive) in Ellis and Branches as fill every nook and open space with shelves.

R ALMONY
JULY 1993

ROUTE

December 2. 1992

Martha Alexander Bowman
Director of Libraries
University of Missouri - Columbia

Board of Curators Meeting
Columbia, Missouri
December 3. 1992

I appreciate having this opportunity to talk with you about the space needs of the libraries on the Columbia campus, and in particular the Ellis Library. As you know, the Ellis Library and its branches constitute the largest public research library in the State. We work closely with the Libraries of the other three campuses to meet the needs of all the University's faculty and students. And, the users of our collections extend beyond the University and throughout the State. I would like to take a few minutes to explain the reasons that the existing request to expand Ellis Library became the highest capital priority for MU and then to outline briefly the current space issues which face us.

In the mid-1970's space problems within the Ellis Library had become so severe that use of the collections was awkward and, in certain sections, almost impossible. (Slide 1) Books were stored in numbered boxes which were piled up near the ceilings at the ends of book stacks, in hallways and even in stairwells. A new annex building had been promised, but no progress had been made on the project.

In 1981 a major study was undertaken by Sasaki Associates, Inc., Mackey & Associates, and MIRA Incorporated. (Slide 2) Lou Martin, the University Librarian at

Cornell University (now Director of the Linda Hall Library, Kansas City) served as the library consultant. This Sasaki/Mackey/MIRA/Martin study identified three major areas of need for Ellis Library: space to house the collections; reader space; and, consolidated and adequate space for staff. As a result of the study, a plan to expand the Ellis Library was developed. This plan envisioned the expansion of the facility in 4 phases over a 20 year period. Following completion of the study, the space problems continued to increase. Books were moved into an old grocery store in order to relieve the crowding, but that facility was characterized by poor conditions. And, in fact, the roof of the store collapsed, leading to the relocation of the books to the annex we now use. Over 440,000 volumes and government documents are located in this annex which is approximately two miles from campus.

Several different units are located within the Ellis Library. (Slide 3) In addition to the library, the building houses the State Historical Society of Missouri, the Western Historical Manuscript Collection and the Ellis Library Auditorium. Each of these units is self-contained with an entrance separate from the two entrances to the library. This slide shows the assignable square footage for each of these units as it existed in 1981, was changed by the first expansion (Phase I, which was completed in 1987) and is currently planned in the Phase II expansion. I have a handout with more details, subtotals and a grand total. Those could not be shown on this slide, and I will be glad to distribute the handout if you wish. The library space is broken out into the three major categories cited in the 1981 study -- space for collections, reader space and staff space.

Phase I of the expansion accomplished several objectives. (Slide 4) In summary, the Phase I expansion reorganized the use of library space, greatly improving the efficiency of the library's functions, and opening up the connection between the original building and later expansions. However, Phase I was not intended to solve the problem of inadequate space for the books and journals.

Phase II of the expansion addresses the need for space for the collections and readers. (Slide 5) Ninety percent of the expansion as planned would be used for housing books and journals and providing reader space.

The 1981 study envisioned that the needs identified for space for collections and readers would be addressed sooner than they have. Consequently, we have a current list of immediate and impending needs. (Slides 6 & 7)

My final slide shows the location of our bound volumes which totalled 2,371,175 as of the end of last fiscal year. (Slide 8) In addition, I provide our estimate of when we will fill completely our shelving for each of the facilities.

When considering the space needs which I have outlined to you, as well as those for the future, an appropriate question to pose concerns the future of the electronic library. Where does it fit into this picture? When I talk about the UM Libraries' plan for automation, I speak as a representative of the Library Directors of all four campuses. On behalf of that group, of which I am currently the Chair, I wish to take this opportunity to

thank the Board and President Russell for your strong support of our work during the past year. We especially appreciate the opportunity to work closely with the Board's Advisory Committee on Telecommunications Technologies chaired by Curator McHugh. The Libraries' plan, which you have approved, now is included in the budget request for 1993-94. We are proceeding, at each of our campuses and within our Directors' group, to prepare for the implementation of our plan beginning July 1st.

We strongly believe that our plans for using new technologies will greatly enhance the Libraries ability to give our users the information they need, when they need it and where they need it -- whether at home, in the office or at the laboratory. These new methods of locating, storing and delivering information will have a significant impact upon the space needs of the libraries of the future. For example, the amount of additional required shelving space will be reduced; however, the need for workstations and instruction space will increase. The 1981 plan for the expansion of Ellis Library did take into account the eventual incorporation of new technologies for that facility; however, the authors of that plan did not have available to them as much specific information as we now possess.

At the same time that we look to the electronic future, each campus continues to have library space needs which are either immediate or near-term in nature. We Library Directors realize that the cost of meeting these space needs is high, particularly when considered in the aggregate. The Library Directors of all four campuses look forward to cooperating in a study of permanent, remote storage facilities.

Although the future use of new technologies holds great promise, we must deal with the transitional period in which we find ourselves. Until the electronic library becomes our full reality, we will continue to have space problems, and I hope that my presentation has given you an accurate sense of them. The matter of adequate housing for the volumes now in the collection on the Columbia campus needs our immediate attention, particularly as the Library of the Columbia campus serves as a resource for the entire University and the State. The books and journals which are now in Annex and Tate Hall, as well as many of the volumes located in Ellis Library, are older materials which are not likely to be converted into digital formats. My office increasingly receives inquiries from faculty and students who are unhappy with the lack of adequate facilities in which to work. In conclusion, I can only add that as we address these complex problems, I and the other Library Directors have as our over-arching goal our determination to use the financial resources assigned to the Libraries as responsibly, effectively and efficiently as possible. We ask for your support and guidance as we do so.

B:\CURATRMT.MK — December 8, 1992

UNIVERSITY OF MISSOURI

# SPACE ISSUES, ELLIS LIBRARY
## Mid-1970's

- Books stacked in hallways and stairwells
- Annex to library planned but not built
- Staff space inadequate, scattered, poorly arranged
- Reader facilities seriously deficient

UNIVERSITY OF MISSOURI

# LIBRARY EVALUATION AND FACILITIES PROGRAM PLAN

## DECEMBER 1981


Thomas R. Mason, MIRA Incorporated

J. E. Robinson, Sasaki Associates

Eugene J. Mackey, Mackey & Associates

Louis E. Martin, Cornell University

UNIVERSITY OF MISSOURI

# FUNCTIONS IN ELLIS LIBRARY BY ASSIGNABLE SQUARE FEET

| | 1981 | 1987 | With Phase II |
|---|---|---|---|
| SHS/WHMC | 31,465 | 33,328 | 47,790 |
| Ellis Stacks | 74,996 | 87,545 | 134,322 |
| Ellis Staff | 35,540 | 45,912 | 52,865 |
| Ellis Readers | 46,740 | 49,129 | 99,318 |

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UNIVERSITY OF MISSOURI

# PHASE I
# COMPLETED 1987

- Consolidated 7 separate reference areas
- Brought Technical Services staff together from 3 different locations
- Opened connections between original building (1916) and later expansions (1936 and 1962)

97

ELLIS LIBRARY PHASE II EXPANSION
UNIVERSITY OF MISSOURI COLUMBIA
PLEASANT GIPSON FIBERS & WITT INC





Slide 5

UNIVERSITY OF MISSOURI

# CURRENT SPACE NEEDS/CONCERNS

**Inadequate room for electronic library**

**No space for new volumes after 1997**

**27% of reader stations lost between 1985-1992**

UNIVERSITY OF MISSOURI

# CURRENT SPACE NEEDS/CONCERNS

**Inadequate room for microforms, documents, and maps**

**Instruction and group study/project rooms needed**

**Rare Books Collections will be filled after 1996**

UNIVERSITY OF MISSOURI

# LOCATION OF VOLUMES

| | 90/91 | 91/92 | 100% Capacity |
|---|---|---|---|
| Ellis | 1,360,151 | 1,380,256 | 1997 |
| Tate | 128,695 | 128,695 | 1992 |
| Annex | 440,000 | 463,470 | 1997 |
| Engineering | 49,661 | 51,653 | 2005 |
| Geology | 44,013 | 46,890 | 1998 |
| Math Sciences | 33,616 | 35,035 | 6/1993 |
| Health Sciences | 189,884 | 195,938 | 1998 |
| Vet. Med. | 42,777 | 44,177 | 1997 |
| Journalism | 24,455 | 25,061 | 6/1993 |
| Gov. Documents | | 1,665,135 | 1998 |
| Microforms | | 5,012,692 | 1997 |
| Rare Books | | 59,732 | 1996 |

# PROGRAM STATEMENT OF SPACE NEEDS
# RELATIVE TO THE PHASE II ADDITION TO THE ELLIS LIBRARY

## I. Introduction and Brief Statement of the Problem.

Library space is typically designed to accommodate three functions. First, space must be available for library books, journals, microfilm and databases as these materials constitute the heart of the library's operations. Second, space must be available for students and faculty to consult library resources, to study course-related readings, and to do research. Third, space must be available for library staff, and to accommodate various service programs. These include classes in library research methods, instruction in database searching, assistance with term papers and research projects, book lending, etc.

In a 1981 consultants report (the Sasaki/Mackey/MIRA/Martin Report) to the Chancellor, Louis E. Martin, then Director of Libraries at Cornell University, stated, in referring to the UMC Libraries: "The present space situation is indeed dreadful. By whatever standard one employs, the university community needs significantly improved library facilities, for books, for readers, and for staff" (see p. 20, Facilities Program Plan for the Libraries of the University of Missouri-Columbia). Some relief was provided by the Phase I addition to the Ellis Library. The addition and renovation (of the first floor only) of Ellis Library has enabled all of the reference librarians and reference collections to be consolidated in one place. The technical services staff have been brought together from four locations within Ellis to a more open (though still semi-crowded) location on the ground floor of the addition. As a result of these improvements, the balkanized separation and overcrowding of staff areas have been largely addressed. However, the acute shortages of collection

shelving space and reader space have not been solved. The Sasaki/Mackey/MIRA/Martin report recommended 200,000 square feet be added to Ellis Library by 1990. As of the end of 1987, with the Phase I addition completed, only 50,000 gross square feet were added, including space assigned to the State Historical Society of Missouri. In other words, the library is still short some 150,000 square feet of space which was recommended nearly ten years ago.

II. Space for Library Collections

Because of the space deficit, more than 465,000 volumes are presently in storage in an Annex, located two miles from campus. This has impeded access to these valuable books and journals and has greatly inconvenienced students, faculty and others who need to consult them. Currently the Ellis Library contains 127,948 linear feet of shelving, which were 97 percent saturated just prior to the transfer of some 100,000 volumes into library space in Tate Hall. Although this move provided for three years' growth for collections, Ellis Library is still filled above 90 percent. In fact, a recent study (January, 1992) has shown that we only have four to five year of growth space available in Ellis, and then we may need to shift over 50% of the collection to just add a few more volumes. And, the Library Annex can only accomodate a total of another 80,000 to 100,000 volumes, depending on the type of shelving and its density that we install. According to most standards, academic libraries are considered to be "full" when the shelves are filled to 75 percent of capacity. Metcalf states that "when the shelves are 75 percent full [when the rate of growth is 3.5% or better] . . . . the next campaign for more space should begin [Metcalf, 1986, p.15]." Or, as stated by Schell:

> "This would make the shelves two-thirds full on the average and would leave 1 ft. of unused space



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> available on each shelf. If collections are growing each year by 5 percent of the collection at the end of the previous year, it will take between five and six years for the shelves to become six-sevenths full, and to leave an average of 5 in. vacant on each shelf. By the time this occurs, the annual cost of labor for the constant moving of books that will be necessary, plus the damage done to bindings by the moving, leaving out of consideration the resulting inconvenience, may well be greater than the interest on the capital sum required to provide for additional shelving [Schell, 1975, p. 346]."

In other words, the additional 25 percent of shelving space is needed for collection growth, to enable books to be easily returned to the shelves after they have been consulted or borrowed, and to allow for shifts of materials caused by the more rapid growth of certain subject areas. When shelves are as filled as they are in the Ellis Library, it is not uncommon for it to take days to reshelve a single volume (if it can even be returned to its proper location at all!). It is not unusual for 14 to 28 shelves to have to be shifted to accommodate one or two returned or new volumes. Were it not for the fact that at least 50,000 volumes (and often more) are in use at any given time, a massive gridlock would occur in which new books could no longer be added to the collections.

III. Reading and Study Space.

With regard to space for reading and study, the Ellis Library contains seating for 1,313 persons, a loss of 28% in the last five years (only 5 percent of the total number of students), exclusive of 28 faculty cubicles and 50 study carrels for Ph.D. students. There is space for some 300 students in six branch libraries. But even when this seating is combined with the space available in the Ellis Library, less than six percent of the student body can be accommodated at any one time.

In reference to seating, Ellsworth Mason suggests "20% of the maximum student body at one time for resident campuses . . . [Mason,

1980, p.8]." Orr suggests, based upon a recommendation from the British Library Association, " . . . one seat for every four students studying in science and technology, one for every three studying in the humanities and social sciences, and one for every ten part-time students [Orr, 1972, p. 132]." Both Schell and Metcalf suggest seating for 25-30 percent of the students at a typical residential university, or 35-40 percent at a "superior residential university" [Schell, 1975, p. 343] [Metcalf, 1986, p. 556]. Thomas Mason states, "A common formula used by state coordinating agencies is that library reader stations should equal 25 percent of the FTE students" [Mason, T., 1981, p.15]. Finally, Mason suggests that UMC needs to supply 10 percent of the full time faculty with their own faculty studies.

Consequently, at least three times as many reading and study spaces are needed than now exist, along with at least sixty more faculty studies, and thirty more Ph.D. carrels.

IV. Staff and Service Space.

While the Phase I addition to the Ellis Library addressed many of the needs in this important area, additional space continues to be needed for computing equipment, instruction rooms, database training, and microform collections. It is assumed no additional space will be forthcoming or needed for staff, unless additional services are needed.

Computer based reference tools are growing in variety and quantity. Adequate space is needed for workstations to accommodate present needs and anticipated growth for ten years.

Instruction rooms are needed that are designed for that purpose in size and shape and located in a place easily accessible to the many thousands of students who come to the library for class instruction. Two full-sized classrooms are needed for Library Skills classes and course-

integrated instruction and seminar rooms are needed for graduate level seminars or other small group instruction.

Microforms has shared cramped quarters with Rare Books for several decades. A microfilm area in the Phase II addition of approximately 8,200 square feet would bring the area up to the standard recommended by Metcalf and provide modest growth space for twenty years. A centralized microforms area provides 1) better utilization of expensive equipment, 2) better utilization of staff, 3) greater accessibility and visibility for microform resources, and 4) greater commitment to microforms as a medium, not mere toleration of them as peripheral to other collections.

Finally, a large part of the UMC Libraries' existing book collection is in a deteriorating condition and in urgent need of conservation and repair. A Preservation Unit has been established to contend with this problem. A preservation lab of 2550 square feet would provide work space for the additional staff and the equipment necessary for these procedures.

Summary of Space Needs, Next Page

V. Summary of Ellis Library Space Needs.

| | | SQ. FT. |
|---|---|---|
| A. | Bookstacks | |
| | 20 years growth, at 30,000 volumes per year, at 250 volumes per section (Metcalf, et. al.), equals 2400 DF sections @ 15 sq. ft. each | 36,000 |
| B. | Seating | |
| | 1. 25,000 students (Chancellor's goal) x 20% = 5000 minus current seating of 1,365 = 3,635 x 25 sq. ft. each | 90,875 |
| | (minus 24 hr. reading room below) | (5,000) |
| | 2. Faculty studies to meet 10% need, = 902 x 10% minus 28 = 62 studies x 80 sq. ft. = | 4,960 |
| | 3. Ph.D. carrels, add 30 at 36 sq. ft. = | 1,080 |
| | 4. Group study rooms (small, one table), at 120 sq. ft. each x 10 rooms = | 1,200 |
| | 5. 24 Hour Reading Room/Study Room for 200 students (at 25 sq. ft. each) = (with a separate entrance and designed to be isolated from the rest of the library after normal closing at midnight) | 5,000 |
| C. | Reference/CD ROM Data Base area (for new information retrieval technologies) | 800 |
| D. | Library Instruction Rooms, two @ 900 sq. ft. (in support of the campus writing program and improvement in undergraduate education) | 1,800 |
| E. | Preservation Lab, Mending Room, Marking area, and Bindery preparation (shared with the State Historical Society and Western Historical Manuscripts) | 2,550 |
| F. | Microforms area (to double current space) | 8,200 |
| G. | Reserve Readings and Check-out Area (near 24 Hour Reading Room) | 800 |
| H. | Microcomputer Lab, near 24 Hour Reading Room, for 50 microcomputers | 2,000 |
| | Total (assignable square ft.) | 150,265 |

**Enabling the Future**

The ultimate purpose of managing information is the enablement of the future: how can we be sure that our knowledge and information resources will be made useful to future generations of users without overwhelming them? How can we be sure that the exponential increase of knowledge will not itself make that knowledge inaccessible?

While the future struggles against being mastered, as an old Latin proverb would have it, we are now, whether we know it or not, struggling with the future. I think it is important to be sure that we are struggling *with* the future, rather than *against* it. The future will happen; we can affect it, we can influence it; but we cannot control it. The purpose--or one purpose--of managing information is to create a saner, more useful information future for our patrons and for our institutions.

**Information, Knowledge and Technology: Gresham's Law**

In his talk at the 1979 White House Conference on Libraries and Information Services, Librarian of Congress Daniel Boorstin captured the minds of his audience by contrasting "The Age of the Book" (which he also called the "Age of Knowledge"), with the "Age of Broadcasting."[3] He observed that the

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[3]Daniel J. Boorstin, "Gresham's Law: Knowledge or Information," in his The Republic of Letters, (Washington, D.C.,1989), pp. 43-49.

terms "knowledge" and "information" are increasingly used as if they are interchangable, and demonstrated that they are not. We can be "informed," just as we can be "entertained," but we cannot be "knowledged." We *acquire* knowledge-- it is an active process, while becoming informed can be a passive one, like being entertained. Knowledge has an integrative element; it implies thought and study, the awareness of context and history. Information is current and newsworthy. Often, knowledge consists of the assembly and interpretation of pieces of information. While knowledge is orderly and cumulative, information is random and miscellaneous, writes Boorstin. A newspaper is filled with information; a book by Foucault or Dante is filled with knowledge.

Similarly, during Boorstin's "Age of Broadcasting," which I prefer to call the *Age of Media*, the words "information" and "technology" have come to be used as if they mean the same thing, or are interchangeable. A "chief information officer" is usually a computer administrator; "information resources" really means computing resources. In this way, the means--computing and networking--become confounded with the ends: information and knowledge. This confounding of terms is interesting linguistically and politically, but it is not useful in terms of product. Our patrons require both the ends and the means; they are concerned about both access and delivery (another pair of terms often confounded with detrimental results). As Patricia Battin has said, we need a careful, user-oriented equilibrium between knowledge, information and technology: "information," she has written, "is the meat in the electronic sandwich".[4] I will use the term "information management" to mean the management of information, and will refer to technology and networking as means of achieving the management of--as well as access to--information.

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[4]Patricia Battin, "The Electronic Library--A Vision for the Future," Educom Bulletin, v. 19, no.2 (1984), p. 12.

There has been little written about the management of information during the last two generations, which is surprising, given that we are living in the "Age of Information!" Those books and articles about "information management," are not about information, but "information resource management," meaning "computer technology and network management." There seems to be an underlying assumption that the issues of proliferating information will be automatically dealt with if we adequately acquire, network, and fund technology as a medium for the handling and communication of information. And the "Information Age" (read my lips, "Computer Age") will witness the rise of a "paperless society" in which computers will be the end result, as well as the integrative medium.

This vision, of the creators of information transparently and easily connected with the consumers of information, has an almost magical ring to it. It has been "technologically possible" for well over a generation, and "just around the corner" for just as long. In fact, the major issue we face as information managers is that the production of new information and knowledge in paper form continues to increase exponentially, its costs continue to rise geometrically, and the financial resources available for it continue to rise arithmetically.

What is the impact of the paradigm shift on academic libraries--especially in research universities? In recent years, our attention has been absorbed too often and too much by coping and confronting rather than devising and executing proactive strategy. Information technology has confronted libraries with important political and theoretical challenges. Some are substantial, and others have a McLuhanesque character, suggesting that the medium is the massage. One of the false premisses of technology is that technology and information mean the

same thing, and that the means of technology can effectively contain and manage the ends of knowledge and information resources.

The production of electronic knowledge is supplemental, not displacive, of information in other formats. Far from reducing the volume of new information, electronic information increases it. This phenomenon has been observed by Daniel Boorstin, who describes it in the broad field of technology as "the Displacive Fallacy:" that new technology displaces old technology.[5] The manuscript continued as a means of scholarly and creative production for centuries after the introduction of printing. Paper took even longer to replace papyrus. The candle is still around, as is the typewriter, pen, pencil, the locomotive, and the propeller-driven airplane. The overhead projector remains indispensable; we even listen to radio and attend concerts.

The potential value of electronic technology as a cost-effective mode of integrating information resources, and as a wonderful tool for distributing and delivering information is clear. However, no unexamined medium is a panacea for everything. Computer technology is very well suited to do some things but not others. Its chief strengths are:

- Connectivity
- Communication
- Complementarity
- Flexibility
- Interaction
- Integration

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[5] "A Conversation with Daniel Boorstin," U.S. News and World Report, v. 88 (Mar 17, 1980), p. 70.

As a tool, as a means, as a modality, technology can allow information to be accessed and used very effectively. If its capabilities are misunderstood and misapplied, the results can be costly and dysfunctional.

Another fallacy is that the video screen will replace the printed text, and that this process of converting information to a "paperless" format will save the world's forests. How many hours a day do you spend reading texts on your video screen? Observing present behavior, it would appear that computer transmission of texts increases the amount of printing. Faculty and students now print on demand whatever they find that they want. This phenomenon is not restricted to the technologically uninitiated. I like to tell of my visit to the chair of the computer science department at Stanford, Nils Nilsson. I was impressed by his high-end workstation, his full page, high resolution color monitor, his sophisticated laser printer, and his very comfortable leather desk chair. It seemed that every effort had been made to provide a comfortable and accommodating environment for computer browsing. "Gee, Nils," I said, awed, "how many hours a day do you spend at the screen? This looks like an ideal setup!" Nils chuckled, and said, "As short a time as possible-- I hate sitting at the screen. Whenever I find something I want, I just print it out!" What is happening is a transformation of the distribution of printed text, not the replacement of print.

# CONCEPT DOCUMENT FOR
# AN ADDITION TO
# THE FONDREN LIBRARY

Beth J. Shapiro
University Librarian
March, 1993

Draft 3(3-31-93)

## INTRODUCTION

The purpose of this document is to describe the mission and goals of the Fondren Library, and to outline the physical facility requirements we need to effectively meet the needs of the faculty and students of Rice University through the year 2005.

At Rice, we are committed to developing and planning for a library of the future -- one that will take advantage of new information technology developments to assist our users in obtaining access to the full range of scholarly information.

As we plan both for new space and the reconfiguration of existing space, we are fully aware of the fast pace at which change is occurring within the worlds of publishing, libraries, and higher education. At the same time, we are aware of the fiscal problems that face higher education throughout the United States. [1]

Research libraries no longer can afford to collect a high percentage of the world's scholarly output. Our responsibility for Rice University is to continue to develop the core collections (in a variety of formats) that support our core disciplines; nevertheless, this will result in limited collection growth in the coming years. Our additional and equally important responsibility is to utilize technology to facilitate our users' access to information regardless of where it is housed.

## MISSION AND GOALS OF THE FONDREN LIBRARY

The Fondren Library exists to support and strengthen the instructional, research, and public services programs of Rice University. We are dedicated to upholding the University's strong commitment to undergraduate and graduate education through the advancement of literature, science, and art, and the pursuit of excellence in all activities. The collections and services of the Fondren Library are administered with the philosophy that the library is more than a collection of books; it is also a gateway to information resources in all formats throughout the world.

The Fondren Library will be an essential campus resource that enables emerging and established scholars to acquire information and gather in an atmosphere conducive to learning and research through the achievement of the following goals:

- Support the scholarly endeavors of the faculty and students of Rice University by providing access to the broadest range of materials both from our own collections and from collections located elsewhere in the region, nation, and the world.
- Develop, organize, and preserve library collections in a safe and secure environment.
- Develop information services that anticipate and respond to the changing expectations and needs of our users and that contribute to developing an information literate public.
- Provide appropriate physical facilities and environmental conditions for the collections and their use with comfortable, secure areas for users and staff.
- Provide appropriate administrative programs to support and encourage the accomplishment of the above goals including fostering a skilled and dedicated staff and implementing strong development and public relations programs.

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1 An excellent report on the current and future state of university libraries can be found in University Libraries and Scholarly Communication, a study prepared for the Mellon Foundation by Anthony M. Cummings, William G. Bowen, et.al. (Washington, D.C. : Association of Research Libraries, November, 1992).

## LIBRARY SPACE: YESTERDAY, TODAY AND TOMORROW [2]

**Yesterday (The Paper Library):** *Jonathon Smith is a scholar of classical philosophy who is studying the history of commentary on the writings of Xenophon . In order to gain access to required information resources , he needed to use the Fondren Library collections as well as to visit libraries elsewhere in the United States. After consulting a variety of printed bibliographies and indexes, he located items available in the Fondren Library. Professor Smith then spent weeks searching through the printed volumes of the National Union Catalog located in the Fondren Library to determine the locations of other books. He also checked various library directories to determine if any libraries around the world specialized in Greek philosophy. He determined that Princeton University contained a number of resources, but their resources were not available for loan through the interlibrary loan system. Therefore, he had to plan a trip to Princeton. For those items not at Princeton, Professor Smith initiated forty interlibrary loan requests. Two years later, he still had not received all of the requested items.*

Fifty years ago, libraries were physically bounded spaces with limited bibliographic access to the holdings of other libraries. The work of scholars and librarians alike was labor intensive and time consuming.

Prior to the 1940's at Rice University, library services and subject collections were administered and housed in various locations on the campus. In the 1940's, the University made a commitment to centralize all library collections and services. The Fondren Library was completed and occupied in 1949.

Combined and growing collections necessitated a major stack addition in 1968. By the 1980's the collections had outstripped the available space. During the mid-1980's, the stacks on the 3rd and 4th floors and in the basement were reconfigured from 30 inch to 24 inch aisle widths thereby increasing the stack capacity by 25 percent on those floors. In addition, a storage facility to house 250,000 volumes was constructed on the south Stadium concourse.

The problems faced by the Fondren Library were and remain typical of those faced by all paper libraries: paper can be used in only one place; a single paper document may be accessed by only one user at a time; and paper collections are bulky and create storage and preservation problems.

**Today (The Automated Library):** *Today, Professor Smith's work on Xenophon is much easier to accomplish. It is still necessary for him to travel to the library to use the library's indexes, some of which are available in CD-ROM format, and to check the OCLC database. So many large research libraries have made bibliographic access to their holdings accessible through the OCLC database that the interlibrary loan process is more responsive. Professor Smith was able to receive all of his interlibrary loan requests within eight months but he still needed to travel to Princeton to use the resources that were not available for loan.*

Today, the Fondren Library is an automated library that functions as a central campus meeting place and plays a key role in the intellectual life on campus. As an automated library, we have computerized our processes but library collections are still primarily paper based. This format coupled with increases in scholarly publishing mean that space continues to be a major strategic issue. The stadium storage facility is nearly full, and the reconfigured stack floors have proven difficult for our users to negotiate and are not in compliance with guidelines established in the Americans With Disabilities Act of 1991. Shelves in the Fondren Library are more than 90 percent full.[3]

Even with the movement of additional materials to storage, the weeding of unneeded duplicates and other materials from our collection, and an increasing use of electronic

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[2] The utilization of the concepts *Paper*, *Automated*, and *Electronic Library* in this section is based on the definitions presented by Michael Buckland in Redesigning Library Services, Chicago: American Library Association, 1992.

[3] Leighton and Weber's Planning Academic and Research Library Buildings (Chicago: American Library Association, 1986) recommends initial loading of stacks at 2/3 of their capacity to accommodate reasonable growth and to reduce the cost of labor for the constant shifting of books that is necessary when shelves are loaded above 85% capacity. (pp. 558-559)

and other high density storage media, we will be out of space by 1995. Despite a necessary $2 million renovation several years ago, we are faced with chronic space problems that have affected and will continue to affect our ability to meet the information needs of the University.

In the last decade, we have made great strides forward using automation. The NOTIS integrated library system software was implemented in 1986, and all of the core modules have been implemented, thereby providing decentralized access to the library's bibliographic records. More than 90 percent of our holdings are represented in LIBRIS, our on-line catalog. Also, the Fondren Library provides access to a wide range of CD-ROM products. We are now in the process of making a number of electronic databases available on the campus network as part of a campus-wide automation effort.

Despite the significant escalation of library materials costs and an increased reliance on microformated materials, the Fondren Library steadily purchases 20,000 - 30,000 books per year and adds another 10,000 to 15,000 volumes annually of bound periodical volumes, government documents, and gift books.

An aggressive weeding of outdated and unneeded materials from our stacks is planned. In addition, the number of government publications distributed in print has declined and will continue to decline dramatically in the coming years. As a result, the library's overall growth rate should decline throughout the remainder of this decade and into the next.

**Tomorrow (The Electronic Library):** *The way in which Professor Smith will be able to conduct his research will change dramatically in the library of the future. From his office workstation, he will trace a thread of his thesis through various library databases , such as Philosopher's Index , that he can access on -line from his office computer. Staying on-line, he can browse union list databases, find other resources, initiate interlibrary loan requests and even receive his requested material -- all from his office workstation. Professor Smith is curious about comparisons drawn between Xenophon's Socratic defense and that of Plato. He accesses another library service that provides several full text databases of classical literature that include works of Plato and the patristic church authors. By performing word and phrase searches within the texts, he is able to verify this thesis about the influence of Xenophon's works.*

Elements of the future already are visible within our library today. During the current academic year, Current Contents, a key research tool for the sciences, was made available across campus through *RiceInfo*, the new campus-wide information system. Plans are underway to provide access to a wider variety of indexes and full-text electronic information sources by Fall Semester 1993.

In the electronic library, documents are digitized and are stored electronically rather than on paper or microformat. These technological advances will not lessen the Fondren Library's centrality to Rice University.

Library staff are engaged in the cooperative deployment of electronic studios on campus. Through the utilization of this technology, the traditional paradigm of the library as a warehouse of stored printed information is changing.

Students and scholars faced with the challenge of keeping current with rapidly changing technologies, will call upon librarians for assistance and instruction. Librarians will suggest systems and/or resources to meet their information needs. The role of library staff will change as they assist users in identifying and accessing needed information both locally from our own collections and remotely from information providers located elsewhere.

Librarians will pursue a leadership role in the delivery of information to our users by working cooperatively with faculty and other academic colleagues. They will provide a combination of digital media and high speed networking that will make it possible for students and scholars to access new worlds of knowledge through electronic studios.

The Fondren Library's collections and staff and the collections of other information repositories will be accessible from electronic studios located anywhere on campus; and through these electronic studios, the linear ordering that characterizes the way in which information currently is provided will be replaced by non-linear forms that allow for the integration of textual, graphic, video, and audio elements. Library services will be responsive to the needs of our users and will empower them to navigate

the growing complexities of the information environment.

In some ways, the physical boundaries of the Fondren Library will become less defined while library services become even more pervasive. It will be necessary for librarians to be more closely involved with the educational and research endeavors of the University. Increasingly, the Fondren Library will become a transparent and efficient international information gateway.

However close the future is, it has not yet overtaken the present. A recently released report from the Mellon Foundation says "Whatever promise the new technologies hold, one may be certain that printed scholarly literature will continue to exist for a long time..."[4]

Therefore, the library as a physical space will not disappear. While significant improvements have and will continue to be made in digitizing currently available print materials, printed books will be with us for a very long time to come. Appropriate physical surroundings and services must continue to be provided. In addition, students and scholars will continue to need a specialized, secure physical space like the Fondren Library that is conducive to learning and creativity.

## FONDREN LIBRARY: SOCIAL AND INTELLECTUAL COMMONS

Our goal in rethinking the Fondren Library is to provide not only much needed space for books and increased electronic and networking capacity, but also a new vision for the library's role in the scholarly process.

Therefore, the new Fondren Library must offer the ability to:

- Facilitate change -- both with technology and with changing patterns of service.
- Promote social and intellectual interaction between faculty and students.
- Foster quiet, individual reflection.
- Provide effective access to locally owned as well as remote collections.
- Support collaboration in the scholarly process.

## PLANNING ASSUMPTIONS

We recognize that a variety of environmental conditions exist that will influence planning for new and reconfigured space.

**Collections:** With aggressive weeding and reduced purchases of print materials, we expect collection growth to slow dramatically from the growth experienced in the past several years. Instead of 30 percent collection growth by the year 2005, our net holdings of books, government documents, and bound journals will grow by less than 20 percent. By any standard, our projections reflect very lean growth between now and the year 2005. Increasingly, we will provide our users with access to information in electronic formats and to information not locally owned. Annually, the Library adds about 8,000 volumes of government documents. Increasingly, the Federal government is distributing government information in microfiche and electronic format. Within the next five years virtually all government information will be distributed this way.

**Funding:** The cost of print journals will continue to rise faster than the Consumer or Higher Education Price Indexes. This will make it increasingly difficult for the University to budget adequate funds to provide local access to all needed resources. New sources of funding will be needed for both collection development and additional staff.

**Library Use:** While faculty use of a library facility will change dramatically as more and more resources are accessible from the scholar's workstation, we expect students to remain very heavy users of library space. The library has and will continue to serve as a campus social and intellectual commons. Given the social activities and close living quarters within the colleges, students will continue to need quiet, contemplative study and research space regardless of what is available from their workstations within their college rooms. Office space for graduate students is limited on campus and this situation also will not change

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[4] Anthony M. Cummings, et.al. University Libraries and Scholarly Communication (Washington, D.C. : Association of Research Libraries for the Mellon Foundation, 1992), p. 113.

dramatically. Therefore, the library will continue to serve as an intellectual retreat for graduate students. New and reconfigured space must provide users with appropriate individual study and research stations as well as group study facilities for those students engaged in collaborative work.

**Physical:** New and reconfigured space must be well-planned and forward-looking. We will plan spaces that are:

- flexible;
- capable of housing dense (compact) storage;
- comfortable and ergonomically correct for users and staff, and
- fully electronic.

**Technology:** Information services for the public will become increasingly automated. Rapid changes in technology will continue to make it ever more important to provide flexible equipment, furniture, and space so that changes can be easily accommodated.

**Training:** Staff and users will require more training due to rapidly changing technological advances and the growth of electronic information.

**The University:** The faculty and student base at Rice will remain stable and will not grow appreciably. However, new academic programs will evolve that will require library support. Faculty office and classroom space on campus is inadequate, particularly in the social sciences and humanities and needs to be addressed whenever possible.

All of the above conditions result in the following assumptions for new and renovated library space:

- Office and classroom space in the Fondren Library for the School of Humanities will be more than doubled in order to address office and classroom shortages on campus.
- Remote off-site storage of collections should not grow beyond 250,000 volumes because of retrieval costs. Instead, intended new space to house print materials should be high-density and user-accessible whenever possible.
- New and renovated space should be flexible to accommodate future changes and must be designed for the utilization of state-of-the-art technology.
- The building design must be compatible with campus architectural designs and should contribute to the development of the University's master plan.

Table 1 provides a summary of existing library space use , in assignable square feet (ASF), on campus.

**Table 1: Summary of Existing Space Use (ASF) in the Fondren Library**

| Floor | Coll. Space | Staff Space | User Space | Tenant Space | Total ASF |
|---|---|---|---|---|---|
| B | 15,657 | 14,819 | 3,546 | 288 | 34,310 |
| 1 | 14,505 | 7,399 | 6,082 | 6,939 | 34,925 |
| 2 | 17,444 | 333 | 5,565 | 1,044 | 24,386 |
| 3 | 19,119 | 2,725 | 9,391 | 0 | 31,235 |
| 4 | 19,385 | 780 | 7,107 | 1,819 | 29,091 |
| 5 | 0 | 0 | 0 | 6,838 | 6,838 |
| 6 | 836 | 24 | 292 | 2,725 | 3,877 |
| Total | 86,946 | 26,080 | 31,983 | 19,653 | 164,662 |

## SERVICE GOALS

The addition of new space and the reconfiguration of existing space will make it possible for us to both fully develop electronic library services as well as meet our historic mission. The following are the goals to be achieved:

1. Provide state-of-the-art, technologically advanced and flexible library facilities that will enhance the Fondren Library's role in the educational mission of the University. As part of this, the following objectives should be met:

   a. Develop a state-of-the-art electronic reference and user support facility.

   b. Develop state-of-the-art music listening facilities that take advantage of new digital formats.

   c. Provide space for the development of advanced electronic information services including Humanities and Social Sciences Electronic Studios and the Texas Environmental Library and Resource Center.

   d. Develop a state-of-the-art curriculum support center that will contain a wide variety of the most up-to-date audio-visual and electronic curriculum materials to support Rice faculty in the classroom and to support the Education Department's teacher training program.

2. Increase the amount of efficient, secure, accessible on-site space for collections for newly acquired material and to achieve the recommended stack aisle widths recommended in the ADA legislation. This goal will be met by:

   a. Establishing a separate bound journals collection that is housed on dense compact shelving.

   b. Utilizing compact shelving in all areas where it is both structurally feasible and will not significantly impede library use.

   c. Utilizing compact shelving for the Woodson Research Center to increase space to house materials and to provide proper environmental conditions for the unique and rare materials housed.

3. Improve study facilities for students by providing a 24-hour reserve/study facility that is spacious and conducive to individual and group study. In addition, this facility will have significant access to electronic information resources and should be designed to make the most efficient use of staff, to have a separate outside entrance for use when the rest of the library is closed, and to be secured and separate from the rest of the library after hours.

4. Improve library staff productivity and user access to services and collections by providing optimally located and comfortably appointed work and public services areas.

5. Provide efficient, state-of-the-art, separately accessible classroom and office facilities for faculty in the school of humanities.

## SPACE PROPORTIONS

### Library Space

Library space is planned for three types of uses: collections, users, and staff. The following is a brief description of the elements contained in each type of space and the overall proportions for the Fondren Library. According to Table 2, our projected space need for the Fondren Library is 201,000 ASF.

**Collection Space: 122,000 ASF - 61%**

1. Compact Shelving

   New developments in shelving technology make it possible to provide high density compact shelving that is easily accessible by library users. Building constraints in the existing Fondren Library make it impractical to plan for compact shelving anywhere but in the basement. All new space should be built with the capacity to support compact shelving.

2. Fixed Shelving

   Fixed shelving will be used to house high use reference collections as well as general collections in other portions of the building that cannot effectively support compact shelving.

**Table 2:**

**PROJECTED SPACE REQUIREMENTS FOR FONDREN LIBRARY TO 2005**

| | | | | |
|---|---|---|---|---|
| **Seating space** | | | | |
| Individual stations | | | | |
| | Electronic information stations | 400@40 ASF/sta. | 16,000 | |
| | Listening stations | 30@30 | 900 | |
| | Individual study rooms | 50@80 | 4,000 | |
| | Research carrels | 180@40 | 7,200 | |
| | General (incl. group studies) | 590@25 | 14,750 | |
| | subtotal individual stations | 1,250 | | |
| Assembly stations: | | | | |
| | Electronic classrooms 2@40 seats | 80@30 ASF/sta. | 2,400 | |
| | Morrow room | 100@18 | 1,800 | |
| | **Total seating space** | | | **47,050 ASF** |
| **Staff space** | | | | |
| | Staff size 142 FTE @ 225 ASF/FTE | | | **31,950 ASF** |
| **Collection space** | | | | |
| | Using 38% compact | | | **122,000 ASF** |
| **Total space requirement** | | | | |
| | Using 38% compact | | | **201,000 ASF** |
| **Existing space in Fondren** | | | | **-164,662 ASF** |
| ***Additional library space needed (@ .65 efficiency)*** | | | | ***36,338 ASF*** |
| ***Total space needed for classrooms and School of Humanities (@.58 efficiency)*** | | | | ***27,360 ASF*** |
| ***TOTAL GROSS SQUARE FOOTAGE NEEDED:*** | | | | ***103,077 GSF*** |

3. Remote Shelving (off-site)

We will continue to shelve 250,000 volumes in the off-site remote facility at the Stadium. Many of these books are older and in brittle condition, but they are still valuable materials.

4. Collection Growth

By the year 2005, the print collection space in the new and reconfigured portions of the library will be filled to 75 percent capacity. If this space continues to be used only for print materials, several more years of collection growth could be accommodated.

**User Space: 47,050 ASF - 23%**

User space includes not only traditional study seats, but also seating for electronic/multi-media workstations, listening stations, enclosed carrels for faculty research use, and research carrels (not enclosed) for graduate student research. Group study rooms to foster collaborative work among the students, 2 state-of-the-art electronic classrooms, and a 100 seat assembly room (Kyle Morrow Room) are included in these calculations.

**Staff Space: 31,950 ASF - 16%**

We have planned for a modest increase in staff work areas. The bulk of the increase is needed for the grant supported projects in which we are now involved and will continue to be involved. In

addition, the space designed for our staff -- particularly those who work directly with the public -- will reflect their new roles in the educational and scholarly research processes.

### School of Humanities Space

School of Humanities space is planned for two types of primary uses: academic offices and classrooms. At the present time, Humanities faculty offices are located in approximately 9,400 assignable square feet in the Fondren Library. In addition, two small and inadequate classrooms are in 672 ASF.

With this plan, we propose moving all Humanities offices and the 2 classrooms into the new wing. A total of 27,360 ASF will be provided for academic offices and classrooms:

**Academic Offices:** **24,360 ASF**

All of the present Humanities tenants in the Fondren Library will be moved to the new wing. An additional 14,981 ASF will be provided to house Humanities faculty who are presently dispersed around campus. Separate access to these offices will be provided only from a west entrance to the building. This entrance will not provide access to any library facility. No access will be provided from the Humanities offices directly into the stacks.

**Classrooms:** **3,000 ASF**

Two classrooms will be provided on the first floor at the west end of the addition. These classrooms should seat fifty students each and should be designed as state of the art learning facilities with all requisite electronic hardware.

### CONCEPTUAL LAYOUT

Our preliminary recommendation is to locate a 65,000 gross square foot three story addition (with a fourth floor in the basement) to the west of the present stack wing. We recommend a footprint of 16,000 square feet.

Figure 1 shows a possible shape and size of the new footprint. Since the building spans a major north - south axis on campus, we suggest that the wing include a sallyport to be constructed opposite the sallyport in George R. Brown Hall. We also propose that the academic offices be located on the west end of the new addition. This west entrance should be designed to integrate the Fondren Library into the quadrangle created by Fondren, Herring Hall and the Rice Memorial Center. Entrances into the Fondren Library proper could be constructed off the sallyport.

INSERT Figure

## STACKING PLAN

Figure 2 presents a suggested stacking plan and distribution of functions assuming a footplate similar to the one presented in Figure 1.

**Basement:** The basement in both the existing building and the proposed addition is ideal for the installation of compact shelving. Bound journals and the Woodson archival collections are to be shelved here. Since all current networking hardware is located in the basement, we recommend leaving the automation staff in the basement. All other staffed functions presently in the basement would be moved to other locations.

**First Floor:** Our most intensively used services and collections are to be located on the first floor. These include Circulation; Current Periodicals, Government Documents and the Texas Environmental Library and Resource Center, Reference, the proposed 24 hour reserve library and the new multi-media center (now configured as CSI). The Woodson Research Center would be located across the sallyport and would have its own entrance. The 24 hour reserve facility also would have an entrance off of the sallyport. Classrooms will be located at the west end of the addition with an entrance off the quadrangle.

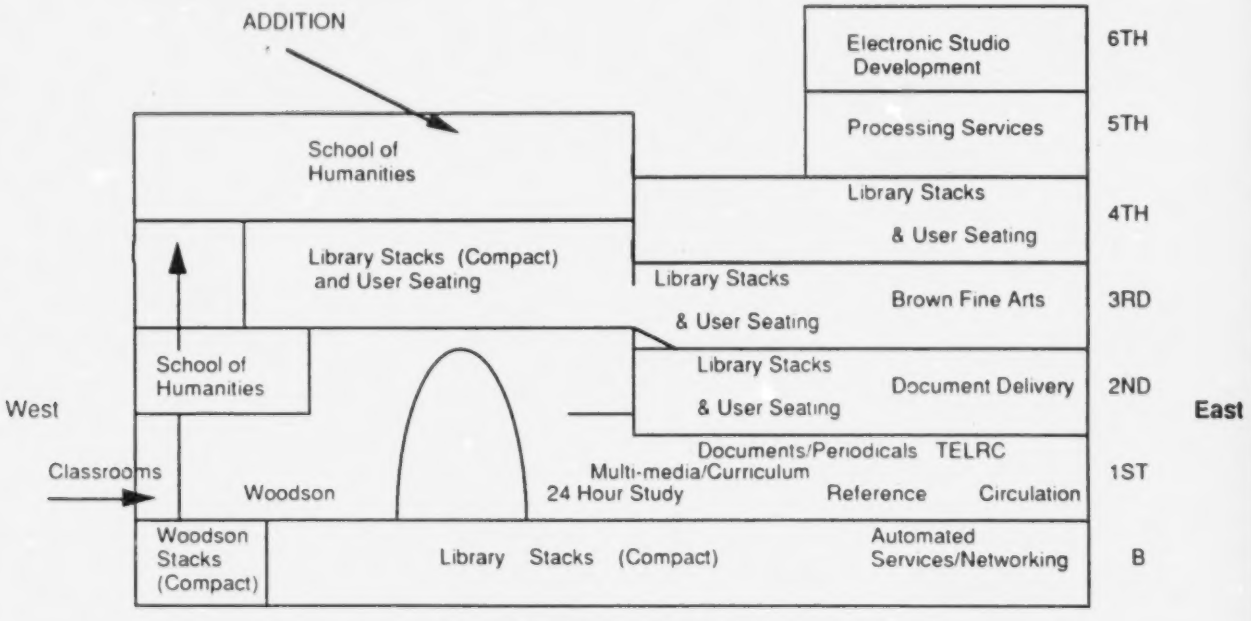
**Second Floor:** The 24 hour facility will have a mezzanine at the second floor. The existing building would house only stacks and user space. West of the sallyport, Humanities office space will be provided.

**Third Floor:** The Brown Fine Arts Library, Library Administrative offices, and the Kyle Morrow Room would remain on the 3rd floor in the existing building. The third floor in the addition would contain publicly accessible compact stacks and user space. Humanities office space will be located at the west end of the addition.

**Fourth Floor:** The fourth floor of the existing building would contain stacks. Humanities offices will occupy the fourth floor of the addition.

**Fifth Floor:** Processing Services will be relocated to the fifth floor and the space they vacate converted to compact shelving. The fifth floor is not suitable for book stacks.

### FIGURE 2: STACKING PLAN




Addition Footplate = 24,000 gross square feet

**Sixth Floor:** Electronic Studio development and demonstration will be located on the 6th floor.

## CONCLUSION

The building program proposed is crucial to the development of Rice University's *library of the future* -- THE VIRTUAL FONDREN . If we are to have a university of the first rank, so too must we have a library of the first rank. This can be achieved only with an investment in the infrastructure.

In the past, the best libraries were ranked highly due to the size of their collections and operating budget. However, the world of scholarship is changing. Today, quality can be measured as much by services and access to information as it can by collections and budget.

> "We have lived for many generations with a world in which the technology of publication meant that access *required* ownership, in other words, that scholarly information was usable only if it were gathered in a large, site-specific, self-sufficient collection. ...New electronic technologies allow the possibility of uncoupling access, the material object from its intellectual content. This possibility is revolutionary, perhaps dramatically so. " [5]

We recognize the changing role of libraries in a highly technological future and are proposing functionally integrated spaces that will link new space with old as well as linking the library of the future with the library traditions of the past.

The space configurations proposed in this document present one possible arrangement of collections and service points. Many creative architectural solutions are possible to resolve site constraints and user accessibility issues. However, compact collection storage is essential as is an investment in state of the art electronic user stations. This proposal is both forward looking and respectful of the architectural heritage and intellectual traditionsof Rice University.

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[5] Cummings, p. xv.

SIU

Southern Illinois University at Carbondale
Carbondale, Illinois 62901-6632

Library Affairs
Office of the Dean
618–453–2522
FAX 618–453–3440

Library Addition Request
Summary of Building Program Planning Statement
August 1993

As the 21st century approaches, SIUC is preparing to meet the challenges that accompany it with a vision and plan for the future of scholarship and learning that will assure superlative educational and research resources for its students, faculty, and the state of Illinois. Keys to that vision are the concept of the Library of the Future and the developing relationships between the Library, the Office of Information Technology, (computing and telephone services) and other campus "information partners." The Library of the Future envisioned for SIUC will be both a physical location -- a major addition to Morris Library -- and a "virtual library," a system of approaches to electronically-based information and knowledge that will provide students and faculty exciting new opportunities for research and instruction and, not inconsequentially, improved productivity.

The Building Program Planning Statement for this addition, developed with the guidance of a Library of the Future Committee appointed by President John Guyon and including representative faculty and students, analyzes in great detail the current and future activities and space demands of the Library and Information Technology. It requests a seamless addition to Morris Library of 296,184 ASF that will house the Library and Information Technology, the primary campus groups responsible for providing the resources needed in this "Information Age." It also requests the renovation of the 197,840 ASF of the current Morris Library. This overview will briefly describe the opportunities and needs of the next decades that make this request justified and, indeed, critical to the advancement and future success of the entire University.

**Leadership and change**

The physical space of the Library of the Future will be home to the campus' library, telecommunications, and computing entities. It is their staffs who will be charged with leading the University into optimal digital information and innovative, technology-based methods of research and instruction. The addition will provide fully functional space designed to support the latest equipment and software, empowering our patrons to take advantage of the new and developing technological tools in their areas of specialty. Indeed, all areas of the academic world, even those usually not associated with technology, are now being influenced by new possibilities.

For instance, literary scholars were once forced to travel to remote locations just to check the records at libraries in the hope that material they sought might be there. Now, the INTERNET, a network of networks that enables one to search for information on an international scale, allows researchers to discover such records without leaving their offices. Indeed, with the advances in imaging, even such primary research material as hand-scrawled notes can be digitized and delivered to the scholar's desktop. Intricate and detailed scientific diagrams and color photographs or illustrations, which have proved problematic to telefacsimile, can now be scanned and transmitted with utmost clarity. Just a few of the developments which will impact our need to have flexible and advanced facilities include:

Hand-held computers (personal digital assistants)
Wireless communications
Storage and processing technology that will make massive computing power affordable on a desktop
"Virtual Reality" as a commonplace method of instruction
Advances in electronic publishing and in imaging

**General description of needed spaces**

The Library and Information Technology must have the facilities to support the revolution in scholarly communication that already is taking place. An addition to Morris Library will allow current campus information initiatives, such as the work of the CIRCA/2001 Team (described below), to continue and to develop exponentially. The addition will contain traditional library and computing space as well as technology laboratories and other specialized classrooms, including:

Advanced laboratories for instruction and research that will allow students, staff, and faculty to create and share units of instruction as well as use products developed elsewhere.

Space and continually updated equipment to provide general access to local, national and international networked information -- tomorrow's books and reader spaces.

Teaching laboratories, where many can be instructed at once. Teleconferencing and distance learning are important components of the Library and Information Technology.

Individual laboratory space similar to traditional library carrels and studies for independent work.

Focused laboratories to support initiatives such as Geographical Information Systems or multimedia.

Creative research and development laboratories where teams of experts can help the University stay current or ahead of developments in information technology.

Staff space that is fully equipped and flexible for the entire staffs of the Library and Information Technology. As in the current space housing the CIRCA/2001 Team in Morris Library, there is a need for jointly-used space where knowledge and expertise, problems and concerns, can be shared.

Help and reference desks that support both technology-based and traditional activities of students and faculty.

Space for servers, and other behind-the-scenes equipment, as mainframes as we know them today are supplanted.

Shelving for library collections. SIUC's materials will continue to be sought by, and available to, distanced scholars.

**Planning process -- Recent developments**

It is urgent that the process that will build the addition to Morris Library move forward swiftly because the Library of the Future already is developing at SIUC. For example, the staffs of the Library and Information Technology have joined with other interested campus partners to form the CIRCA/2001 Team. This group already is working closely together in the former card catalog room in Morris Library to develop and prepare many of the items discussed above. Some major accomplishments already have been realized, chief among them the development of the Campus Wide Information System (CWIS), and its first module, the information system called LINKS (Library Information NetworKS). This was introduced in August 1992. LINKS allows users to browse the catalogs of over 800 libraries in Illinois and permits them to check out materials from over 40 academic libraries, including all the state-supported institutions. It also permits access to the full text of Shakespeare's work; to IBIS (Illinois Bibliographic Information System), which allows access to heavily used magazine indexes and which allows any user to order articles to be delivered to them through telefacsimile; to Ask a Librarian which allows people to ask reference questions via electronic mail; and to literally thousands of libraries through the INTERNET. Recent plans call for the expansion of materials available as full text, such as sources available through Nexis, a full-text news utility covering both international and national news and business publications.

The CWIS allows access to information ranging from the local Amtrak schedule to the databases on the INTERNET. It helps coordinate all the system initiatives of Information Technology including many of the recent endeavors in student information management and services.

**Meeting current needs**

Although the printed page is no longer the sole means of scholarly communication, it is still a significant vehicle and will remain so while the various cultures and technologies of both the publishing and rewards systems change. Most experts do not see cessation of the print outpouring during the next two decades. As the full report explains, Morris Library already holds twice as many materials as originally intended, and because shelving has taken the place of reader space (resulting in a deficit of 160,570 ASF), it cannot begin to meet the seating needs of the students. The additional shelving and volumes have taxed the heating and cooling capabilities beyond their limits. The print collection will grow, albeit at a slower pace, in the next twenty five years since many materials will not be available in other formats for some time to come due to an intricate array of technological, economic, and cultural forces over which neither the Library nor Information Technology has control.

In the same manner, as technology becomes an integral part of more and more of the academic world, Information Technology's need for space to satisfy the present demands of the faculty and students has been outstripped by the space it now has.

However, although an addition to Morris Library will relieve the pressures for space to meet the current and traditional needs of the Library, Information Technology, and Telephone Services -- needs that cannot be minimized -- it is as an incubator and home to the exciting and innovative plans of our organizations that the addition becomes a compelling priority for the campus. As the report affirms, our students and faculty must be able to use a hospitable facility as they move with the onrush of technological innovation. There is obviously no better investment in this future than in a building housing the energetic and innovative initiatives of the Library and Information Technology -- initiatives designed to advance research and learning and to prepare students for productive roles in society.

**Renovation**

Morris Library opened in 1956 and, although there has been recent work done on the HVAC system for floors 1-3, by and large the building is in need of much renovation. The constant fluctuation in temperature and humidity is taking a toll on the collection; the electrical wiring is neither safe nor adequate for the needs of a modern library addition (data wiring is difficult because of the library's basic structure); the furniture and other equipment is worn out. A renovation project to Morris Library is needed, to meet current academic library needs, to make effective and efficient use of the building, to provide for optimum operational economies, and to unify the existing building with the addition. A renovation will bring together functional areas, employ the most advanced technology, supply basic environmental conditions, and provide an appropriate mechanical facility.

Library Affairs and Information Technology are service organizations charged with missions that support the academic efforts of the university. Indeed, Library Affairs is operationally a part of Academic Affairs, further underscoring its academic as well as service functions. In ways both similar and individual, each organization achieves its goals by providing the expertise and physical wherewithal to find, create, or use information in a timely fashion. These missions will not change as the University moves into the next century; however, the means we use to achieve our goals -- the technologies we exploit and the skills we employ -- will change, and will change continuously.

Both Library Affairs and Information Technology are complex organizations that are battling current limitations in both the quality and quantity of available space. Despite the handicaps of having staff scattered across campus in less than adequate facilities, we are leading the campus into the new frontiers of the information age. Both organizations have striven to provide important and vital services to the faculty, staff, and students of SIUC and, indeed, also to the Southern Illinois region. Together and in their other partnerships, they have demonstrated their abilities to move forward in many areas through recent, vibrant initiatives.

It is essential that the work of Library Affairs and Information Technology to provide support to the faculty and staff be itself fully supported. The Library addition will provide the campus with a hub for the effective development of information technologies, and the infrastructures to support the rapid and creative exploitation of those technologies. The addition and the services it provides will serve as a catalyst for the campus at large to meet the challenges of a new century while providing a facility students will seek out and will utilize to their best advantage.

Summary of facts:

**Library Affairs Space Deficit 1993**

| Space Type | Current Space | Current Need | Current Deficit |
|---|---|---|---|
| * Collection | 121,239 | 190,534 | 69,295 |
| Patron | 37,084 | 125,801 | 88,717 |
| Service | 39,517 | 42,075 | 2,558 |
| **Grand Totals** | **197,840** | **358,410** | **160,570** |

**Library Affairs Space Need-25 Year Growth (2018)**

| Space Type | Current Space | 25 Year Need | 25 Year Deficit |
|---|---|---|---|
| * Collection | 121,239 | 291,583 | 170,344 |
| Patron | 37,084 | 125,801 | 88,717 |
| Service | 39,517 | 47,925 | 8,408 |
| **Grand Totals** | **197,840** | **465,309** | **267,469** |

**Projections for User Space**

| | | |
|---|---|---|
| a. | Undergraduates (lower division) | 35,845 asf |
| a. | Undergraduates (upper division) | 67,450 asf |
| b. | Graduates | 19,854 asf |
| c. | Faculty | 2,653 asf |
| | Total | 125, 801 asf |

*"Collection" includes the space needed for access to materials and information in ALL formats -- paper, microforms, sound and video recordings, CD-ROMs, and all other technology-based information.

Carolyn A. Snyder
Jay Starratt
David Koch

THE UNIVERSITY OF TENNESSEE
KNOXVILLE

MEMORANDUM

TO: Joe Johnson

FROM: Paula Kaufman Paula

DATE: December 28, 1992

SUBJECT: Libraries, Books, and Technology

University Libraries

Office of the Dean

Yes, indeed, it is much too simple and naive to argue books and periodicals versus technology. However, before providing some specific examples of how the UTK Libraries is using technology, I would like to pause for a moment to recollect for Dr. Roaden and Mr. Manning what academic libraries are: places (physical and virtual) in which the community of scholars, either individually or in groups, interact with ideas communicated through a variety of media over the ages. And, academic libraries are very much physical places in which people interact with each other.

There is no evidence today that electronic formats will replace the use of printed formats. The significant change is the end of the printed page as the sole means of scholarly communication, information storage, and retrieval. Building the links between information in electronic and printed formats poses an important challenge for the next decade, and the success of electronic technologies as scholarly tools depends heavily on our success in creating convenient, effective links among all formats, not replacing one with the other.

Over the last few decades the output of scholarly information has skyrocketed. The similarly skyrocketing prices of most of these materials, coupled with the declining strength of the U.S. dollar, results in libraries being able to purchase a declining portion of the world's scholarly output. It is important to note, however, that we do continue to acquire printed scholarly materials and will do so for decades to come. The publishing industry, especially scholarly publishers, have been very slow to invest the capital required to publish in electronic formats, and the academic community is wary of accepting any publications, electronic or printed, that have not been through a rigorous quality-control process (i.e., refereering). There are literally only a handful of electronic publications that even attempt to perform a quality-control gate-keeping role. Then, too, it is unlikely that publishers in the second and third worlds, from whom we acquire a significant amount of materials, will publish in anything but ink on paper for decades to come. However, while we continue to purchase materials in print formats, we are investing in new technologies to provide access to information we cannot afford to purchase regardless of its format: print, electronic, audio-visual, microform, et al.

I cannot speak to the situation at the other UT libraries, but I can certainly assure Dr. Roaden and Mr. Manning that the technologies mentioned in the article about the University of Alabama library are being implemented here at Knoxville -- in fact, I hope it is not too

arrogant to say that we are well ahead of Alabama in many ways. And, part of the reason that we are well ahead is the Hodges building, which provides the platform from which we can launch access to many of these resources.

If you'll indulge me a bit, I'd like to list a few examples of the ways in which we are using technologies to provide UTK students and faculty excellent access to information resources.

- Our online catalog is accessible 24 hours a day to anyone who has a connection to our campus network -- either a direct connection, a dialup connection, or a connection to the internet or bitnet (which means, literally, access from nearly anywhere in the world). The card catalog has already been removed from the Music Library and will soon be removed from Hodges.

- We have purchased many databases -- bibliographic, numeric, full text -- on cd-rom. At the present time, all are available to users who come to the library. However, as soon as the license agreements are renegotiated (which should be within the next two months) we will make several of them accessible on the campus network, available to anyone with a microcomputer with an ethernet card and connection to the network.

- Of even more value, however, will be the library's online library information system, which, too, will be available on the campus network this spring. The system will enable users from anywhere on campus with connection to the network and an ethernet card menu-driven access to a wide variety of information resources available on the internet. These resources will include more than 500 library catalogs, electronic journals, electronic books, encyclopedias and other reference books, and connections to other information systems, such as the one run by the National Science Foundation. This system will, literally, open access to the world's resources for Knoxville students and faculty. (I'll be glad to show you a prototype in my office at your convenience.) We have been working with UTCC so that our system will fit into a larger campus-wide information system. I believe that ours will be the first piece available. Our system will also include forms for users to fill out for interlibrary services, reference assistance, placing items on reserve, and the like, thus bringing many of the features of the library right to the desk top.

- Despite the attention given to the possibilities of electronic publishing, very little is actually available today in electronic format. Our bigger challenge is to deliver copies of printed materials held by other libraries speedily to UTK students and faculty. We are using newly-developed equipment, called ARIEL, that enables us to scan, send, and receive copies of printed items over internet. This system, used also by UT Memphis, provides higher quality

and lower cost materials than traditional telefacsimile. We are working also to develop systems that will enable us to deliver these electronic texts that are not available in our library directly to an individual's workstation.

- The campus cable and fiber networks are providing us the opportunity to make access to our a-v collection available to any room (classroom, office) with the capability of receiving it. No longer do classes have to come to a physical library building to view these materials. However, because so few rooms are outfitted to receive this information, library group viewing rooms are still overbooked; we could have twice as many and still not fill the demand. In addition, the need for space to store and broadcast these videos will do nothing but increase.

- The UTK Libraries is engaged in a number of funded projects to test new ways of accessing and delivering electronic information. These include introducing a powerful, pc-based, Geographic Information System to campus; providing access to some 30 electronic journals in materials science; and using the new Xerox DocuTech equipment to digitize two important music manuscript collections and make them available to scholars everywhere through the internet.

- We also have some interesting projects in the planning stage. For example, we are preparing a grant proposal for the Department of Education to develop a simulation of the branch library environment through workstations. Another one for the Council on Library Resources proposes to fund the planning required to deliver research information to the occupants of the soon-to-be-built state-of-the-art Science and Engineering Building. And our work with Continuing Education and the Graduate School of Library and Information Service will help us develop ways to provide information support for distance education students. The primary challenge there will not be to deliver technology but to find ways in which to support the needs of these students and faculty for printed materials.

These activities are only a few examples of how we at UTK are applying technology to deliver information to our students and faculty. I understand that Homer Fisher will soon be setting up regular discussion groups among the UT library directors, and once he does we should have more information about what's happening where.

A few thoughts in closing. First, the need for space is not obviated by the emergence of technology-based resources. Publishers are still printing books and journals, and the need for collections of these materials, on-site, is critical to a university, especially a research university. Technology itself, too, requires space --space for workstations, information servers, and other devices to access and deliver electronic materials. And, technology requires up-to-date wiring and equipment.



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None of these new technological wonders can be implemented without trained librarians and staff. We need to invest more in our people, to train them and to help them keep their skills up-to-date. That is no simple task.

Finally, I believe it is critical that we continue to view the library as a place, a place in which students can study individually and in groups, a place in which faculty can work alone or together, a place in which faculty and students can browse the shelves, get new ideas, think, and exchange thoughts with each other.

Philip D. Leighton and David C. Weber, writing on the influence of technology on academic libraries, noted that

> There will continue to be rationale for traditional access to library materials (walking to the shelf and fetching a book, for example) ....Only to a very limited degree will computers be used for full text until late in the next decade....Concerning seating for readers, the traditional functions of the library will continue and will be supplemented by the computer to a large extent. Significant changes will result in the configuration and operation of reading areas....We believe that...the library will continue to be in heavy demand for serious reading in quiet space and for the use of computers in support of study, course work, and research.[1]

It is hard to imagine a university without a library building, and it is even harder to imagine a first-rate university without up-to-date library facilities. The books we have won't go away (except if we are negligent and allow them to deteriorate over the next fifty years), yet the need for space in which to study and think, in which to acquire and use information will continue to grow. There is no rational tradeoff between books and technology. They are all parts of a continuum whose end is infinite.

PTK:mcj

c: C. Moss

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[1] Leighton, Philip D. and Weber, David C. "The Influence of Computer Technology on Academic Library Buildings: A Slice of Recent History," in Academic Librarianship, Past, Present, and Future: A Festschrift in Honor of David Kaser. Edited by John Richardson, Jr. and Jinnie Y. Davis. Englewood, CO: Libraries Unlimited, 1989, pp. 13-30.